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BRIEFLY TOLD.

THE DENVER FRANCHISE.—Mr. Henry L. Doherty has demonstrated in Denver, Col., that a reasonable franchise can be obtained by educating the people on the question involved, and in so doing he is carrying out in practice what he has been preaching for some time. As the terms of the new franchise are interesting and somewhat different to the general run, we herewith reprint the gist of the terms as follows. The Gas Company is permitted to do the following things: To erect poles, lay gas mains and do its general business throughout the city and county. To acquire the contracts and franchises of the Lacombe Electric Company, relieved of the option of the city to purchase the same. To charge for the private use of gas $1.10 per 1,000 cubic feet, with a discount of 10 per cent. if paid within 10 days. To charge each consumer of gas not less than 25 cents per month. To charge for the use of electricity for private use 10 cents per kilowatt hour, with a discount of 10 per cent. if paid within 10 days. To charge at least 5 cents for each electric lamp installed for private use, and in no case less than $1 per month for each private consumer of electricity, and to charge larger specified amounts on what is termed the "readiness-to-serve" basis. To receive for street lighting with gas under contracts to run 10 years, $28 for each 50-candle power lamp. To furnish under contracts all city arc lights required on a basis of $60 per year. (No candle power specified.) To furnish electric power on a basis of 4 cents per kilowatt hour, with a discount of 10 per cent., the Company to receive not less than $1 per month per horse power connected, and in no case less than $3 per month a consumer. In return for these public privileges the Gas and Electric Company makes, among others, the following promises: To pay into the city treasury 8 quarterly installments of $12,500 each, or a total of $1,000,000 in the 20 years; the amount paid in any one year being the equivalent to 5 per cent. on $1,000,000; also to pay into the city treasury the following sums: During the remainder of the year 1906, after the granting of the franchise, and in 1907, all gross receipts from gas in excess of an average of 95 cents per 1,000 cubic feet, also the similar gross receipts from electricity for lighting purposes in excess of 7½ cents per kilowatt hour; in 1908–9 such gross receipts from gas in excess of an average of 90 cents per 1,000 cubic feet, and of electricity for lighting purposes in excess of an average 7$\frac{1}{10}$ cents per kilowatt hour. In 1910–11 such gross receipts from gas in excess of an average of 85 cents per 1,000 cubic feet and from electricity in excess of an average of 6$\frac{1}{10}$ cents per kilowatt hour. In 1912–13 such gross receipts from and in excess of an average of 80 cents per 1,000 cubic feet, and from electricity in excess of an average of 6,$\frac{3}{10}$ cents per kilowatt hour; and from 1914 to 1926 such gross receipts from gas in excess of an average of 75 cents per 1,000 cubic feet, and from electricity in excess of an average of 6 cents per kilowatt hour. The Company further agrees to extend its lines 100 feet free of charge to anyone agreeing to use the same for at least 1 year.

NOTES.—

DOWS, IA., will have a gas plant if Geo. S. Forrest and W. K. Woods, of Iowa Falls, Ia., can get a franchise.

WM. TRACEY has been awarded the franchise for the construction of a gas plant at Amarillo, Tex.

LIBRARY OF CONGRESS JUN 11 1906 SMITHSONIAN DEPOSIT

THE Charlestown Gas and Electric Company, contemplates the construction of a 2,000,000-cubic foot holder this year, also a 12-foot meter.

MR. JAS. W. LANE has resigned from the Atlantic City (N. J.) Gas and Fuel Company.

THE Bristol Recording Gauge Company are issuing an interesting pamphlet on Bristol patent steel belt lacing.

THE Committee on Rates, of the Western Gas Association, comprise the following men: H. L. Doherty, Geo. McLean and Wm. H. Gardiner, Jr., Chairman. The three other additional men mentioned in last week's issue were not appointed.

THE officers of the Guild of Gas Managers of New England are as follows:

President—John A. Coffin, Gloucester, Mass.
Vice-President—Wm. E. McKay, Boston, Mass.
Treasurer—Wm. A. Wood, Boston, Mass.
Secretary—W. G. Africa, Manchester, N. H.

HENRY MAGUIRE, Superintendent of the Alton (Ills.) Gas and Electric Company, has resigned his position.

THE capital stock of the Warsaw (Mich.) Gas Company is $150,000. The Directors are James T. Lynn, A. L. Wilkinson, Frank K. Pelton and R. T. Grey, of Detroit, Mich., and George G. Atkinson, of Goshen, Ind. It is practically a reorganization to take over the plant and system of the Warsaw Gas Light and Coke Company purchased last November by a Detroit crowd.

THE Garnett Gas Company, of Garnett, Kas., was sold for the sum of $59,000 to Mr. Joe Carey.

FRAMINGHAM CENTER will have gas piped from Framingham, Mass.

THE new merger of the electric light, street railways and gas properties in Norfolk, Portsmouth, Berkley and Suffolk, Va., is capitalized at $8,000,000 bonds and $6,000,000 stock.

THE city gas works of Kearney, Neb., were sold to H. D. Watson. The plant will be rebuilt.

GLASSBORO, N. J., expects to begin work on its new gas plant immediately.

Recent Patent Issues.

Prepared for the AMERICAN GAS LIGHT JOURNAL by Royal E. Burnham, solicitor of patents and counselor in patent causes, 833 Bond Building, Washington, D. C., from whom illustrations and specifications of any patent mentioned below may be obtained for 10 cents.

820,485. Process of producing gas. Byron E. Eldred, New York city, assignor to Combustion Utilities Company, same place.

820,525. Method of treating and utilizing gases. Frederick W. C. Schniewind, Everett, Mass., assignor to the United Coke and Gas Cas Company, Charleston, W. Va.

820,563. Gas meter. James Green, Brooklyn, N. Y.

820,622. Gas Burner. F. O. Carlson, New York city.

820,647. Safety gas burner. Samuel Katz, New York city.

820,676. Incandescent burner. James B. Sheehy, New York city, assignor of one-third to Philip C. Peck, same place.

820,711. Incandescent gas burner and lamp. Adolphus S. Francis, London, England.

820,772. Apparatus for purifying gas. Albert Elsenhans, Ruttenscheid, near Essen-on-the-Ruhr, Germany.

820,835. Gas check. Albert Ullman, Macon, Ga., assignor of one-half to Ramsdell Inverted Gas Lamp Company.

821,633. Gas stove. George W. Graves, Rochester, N. Y.

821,694. Gas burner. Louis H. Bacque, Three Rivers, Can.

821,846. Mirror attachment for gas stove doors. Benjamin F. Allen and George R. Ford, St. Louis, Mo., said Allen, assignor to said Ford.

821,928. Process of making gas. Fritz Dannert, Berlin, Germany, assignor to Julius A. Hutmacher, same place.

821,995. Gas producing and consuming apparatus. Carleton Ellis, New York, N. Y., assignor to Combustion Utilities Company, same place.

822,132. Gas generator. Abram H. Jones, Hartford City, Ind.

[OFFICIAL REPORT—REVISED BY THE SECRETARY—CONTINUED FROM PAGE 974.]

THE TWENTY-NINTH ANNUAL MEETING, WESTERN GAS ASSOCIATION.

HELD IN CLEVELAND, O., MAY, 16, 17 AND 18, 1906.

FIRST DAY—MORNING SESSION.

Discussion on the Paper by Mrs. O. N. Guldlin.

Mr. Clark—Mr. President, Members of the Western Gas Association: The writer of the paper just read has touched upon a vital point, when speaking of the inter-relation of the homes and business of our country. In the strenuous life of a manufacturer the fact that his success is dependent upon a great body of consumers is sometimes crowded into the background. In the gas business much has been done to meet the demands of home life for more scientific adapting of fuel to produce heat and light, but much remains to be accomplished. While gas as a heat producing fuel has been an emancipation to thousands of slaves of the coal bin and ash heap, why should its benificence stop until the coal range is as extinct as the fireplace and crane, and they are also furnished with power for tens of other household tasks. A gas engine to furnish power is not really a more startling proposition than an electric motor for running a washing machine, a sewing machine, an egg whip, a carpet beater or any other household appliance that to-day is run by woman power—too often at the expense of better uses to which it might be put. It also shows that real need exists in hundreds of households for just the simplyfying and lightening burdens of housework that gas service is able to render—and gas companies are anxious to give. It seems to be a question of adequately adjusting supply and demand. It has often been said that women are the only consistent conservatives. To a certain extent this is true, yet we can adapt the famous words of the Florentine philosopher and assert "She do move"—and in proof quote from the able paper just read, an experience of a demontrator in Fort Wayne. Inventors are busily filling the world with complicated helps; reformers raise their voices in demand for altruistic efforts; associations, clubs, societies all demand an increasing proportion of the home women's time and vitality. How shall external growth be secured without sacrificing the soul of home life? Obviously—by cutting out everything not essential. As long as we live we must eat, but with the *time and labor* of preparing food reduced by 30 per cent., just that much is added to time for outdoor recreation, study, companionship with the children, whatever you will. A 10 per cent. reduction in *cost* at the kitchen end of the house is just that much to be laid aside for a rainy day, a vacation trip or the foundation of a library. Before this audience it is not necessary to prove or even argue these propositions. You know they are true, but what steps are you taking to prove them to the great body of average people? Expositions with their displays of household equipments reach a few, but our stunt is to reach every household in the area supplied with gas, the millionaire's mansion on Gilt Edge Avenue, and the tenement in Empty Pocket Row, the highly organized *ménage* of the clubs and the cosy corner of the bachelor maid. In by far the greater number of these kitchens the clumsy, wasteful coal range still holds its place with its artillery battery of heavy iron utensils simply because the users suppose it to be necessary. How shall we replace this coal eating, life consuming monster with more sensible appliance in the kitchen? Borrow a phrase from a recent political campaign and say "This must be a campaign of education." There is no gas user who will not assent at once to the proposition that it would be a good thing to use gas for cooking all the year round, but instantly and insistently comes the inquiry, "How shall I heat my kitchen?" It is our business to show them that heating can and should be divorced from cooking. The modern house builder provides for heating the kitchen with as much care as he heats the hall, but in houses of an older type where the heating system cannot conveniently be extended to reach the kitchen the gas company needs to train the public to use a small, compact, clean, convenient heating stove to give heat, while the gas range takes its proper position as an all-the-year-round necessity for cooking. We may not accomplish this in one season, or even in two, but the change is sure to come, and each home that adopts this rational plan is a missionary center for a more or less important area. Allow me to sketch for you the work now being done by The Laclede Gas Company, as an illustration of this point. We are employing a corps of more than 30 women, who are first trained in our instruction kitchen in the best methods of using gas for any household purpose. They are then

assigned certain districts in the city, within which they call upon every family, not in a perfunctory, commercial spirit, but with the idea of neighborhood friendliness, asking each consumer about their success in using gas, listening to what they have to say, and with as much tact as possible suggesting ways to use gas to advantage. Each instructor carries literature showing the best and latest gas appliances, and in this way is able to suggest the replacement of worn out, antiquated tools with those of better pattern. Although this plan has been in operation only a few weeks, we have already been made to feel a change in the attitude of our customers. They realize they have "a friend at court," and many tangles of discontent lasting anywhere from two weeks to two years have been happily straightened out. The lack of information as to what a gas stove ought to do and ought not to do would be irresistibly funny, if it were not so pitiful. No one can rejoice more heartily than the gas man, when educated women such as are represented in the federations of women's clubs, recognize the importance of proper education along this line, and we enthusiastically hail the work done in the public schools as a most effective way of spreading a practical knowledge of using gas appliances.

The President—Mr. Chamberlain, will you read Mr. Butterworth's contribution?

Mr. Chamberlain—These notes on Mrs. Guldlin's paper were written by Mr. Butterworth. As he is unable to be present this morning, I will read them for him.

Mr. Butterworth (read by Mr. Chamberlain)—Briefly stated, Mrs. Guldlin's paper is an appeal for gas companies and gas men to help woman kind to a knowledge of the best practical means for getting the most out of gas in the more scientific operation of the domestic kitchen and laundry and the illumination of homes. The keynote of the paper is sounded in the second paragraph of page 177, which says: "Women must lay aside the old-fashioned way of doing things and put the same science into the home that men are putting into their business, and personally I believe that many women are only waiting to learn what these best thin gs are." Again, at the top of page 180: "Women are everywhere awakening to the fact that the scientific management of the home is the su rest solution of their troubles, and perhaps the best and only way to the establishment of health, happiness and a better moral condition." Mrs. Guldlin's suggestions are valuable and strictly practical. She wants the gas companies to show womankind how to use gas in the home to the best practical advantage. We may think we are already doing this, but how many gas companies are there that have gone to the trouble and expense of providing model exhibition kitchens, laundries and living rooms at their offices or elsewhere in the city, equipped with all the best and most modern and scientific gas appliances for cooking, broiling, laundering and lighting, so that the women of the city may come and learn by this most effective object lesson method? Very few indeed, and almost as few are those that are, in any real, systematic and thorough manner, disseminating literature or printed information or instructions along these lines. Taken altogether, Mrs. Guldlin's paper is extremely timely and valuable in its practical suggestiveness, and it voices a real want. It should direct our attention to the many ways which we are still neglecting, or but partially utilizing, for thoroughly instructing our respective communities as to what is now best and most scientific in the way of gas appliances for the home.

The President—Is there any further discussion?

Mr. J. B. Howard—Mr. President and Gentlemen: When I received notice from our honored President that I had been selected to discuss the paper prepared and presented by our esteemed friend, Mrs. Guldlin, I felt highly honored, inasmuch as Mrs. Guldlin is the first woman who has ever appeared before a gas association and taken part in its deliberations in the United States or Europe, and we hail her with a mingled feeling of pride and joy at this convention. We have often read the Bible story of how the first woman brought misery to mankind in the garden of Eden, and we often appreciate how man has been in misery ever since that first appeal of woman. But after carefully reading this excellent and far-sighted appeal, prepared for our consideration by our thoughtful and accomplished first lady, Mrs. Guldlin, we are forced to the conclusion that woman's mission on earth is changing as rapidly for the happiness and enjoyment of man as gas is to the happiness and enjoyment of a modern home; we acclaim with the poet, "Woman, thou art a jewel;" without thee the home would be dark and dismal and the lamp of life would be burning low and the progress of the ages would have been materially retarded. Woman and her numerous wants once positively stated or made known accelerates the inventive genius of man, and he labors unceasingly to satisfy her desires. We are quite willing to forget the menial position which woman held in the earlier civilization of the earth, and hail with delight the advancement she has made and the position she now holds in the social, industrial and scientific world. To-day her influence is felt in every department of our goverdment, and particularly with that branch which has charge of unfortunate men and women charities, and these elements of our civilization which tend to make mankind better and happier. Through her the modest, humble home of the present day in many ways has been made to surpass the ancient splendor of the palace of old, and her many social functions and evening entertainments have caused the gas meter to register many points in our favor. But to be more serious. We must recognize the many great truths stated in the paper of Mrs. Guldlin. The world is progressing and domestic science has perhaps made greater advancement than any other branch of our civilization. We accept and indorse the entire document written by her without the least objection, and recommend it for a candid consideration by the members of this Association. That our civilization is constantly changing is a fact easily recognized by everyone. The duties of the kitchen and the home are often made unattractive by reason of its lack of modern appliances; and the once happy, rosy-cheeked kitchen maid has deserted the "song of the kettle" and has been lured by the clacking typewriter to offices in the great business blocks of the cities; she, who was once the queen of domesticity, is now the sallow-faced office or factory girl. We believe with Mrs. Guldlin that the modern uses of gas and gas appliances will do much to correct the growing tendency of the times and make more inviting and enjoyable the various duties of the home. Mr. President, I am quite sure I voice the sentiment of every member of this Association in saying long life and good health to Mrs. Guldlin. Mrs. Guldlin, at the Board of Directors' meeting it was unanimously voted that you be presented with a badge of the Western Gas Association. May you live long to wear it and hand it to the posterity of your family for many, many years. (Handing an Association badge to Mrs. Guldlin, amid great applause.)

The President—Mrs. Guldlin's paper is open for discussion, gentlemen. The subject is one appealing to commercial men. We tried to arrange our programme to give variety in subjects, and for the moment the commercial men and women have the floor. Are there any further remarks? If not, Mrs. Guldlin, you have the floor.

Mrs. Guldlin—I am sure this is a very great, enexpected and pleasant surprise, to be linked with this fraternity. In writing my paper I was haunted in some way with an ideal right from the first, and when at the last minute I was forced to send the paper on, I realized I had not reached the ideal, that something of the joy and beauty and feeling that I wanted to bring or you had not, after all, crept into my paper. But did ever anyone write to say what he wanted to, to his first and only love? I consoled myself, however, by thinking that Uncle Jerry and others came on and all I had left unsaid would be said, and you see that it has been more than said, it has been beautifully said. In regard to Mr. Butterworth's paper, he spoke about the gas companies furnishing the rooms. I think that would be lovely, but I really meant to convey the idea that if the gas companies united with the furniture companies and a lot of other companies, and they united with the clubs the club women would be only too glad to do the work, and by co-operation we could at a very much less expense bring this universal knowledge to all, and we would enter places and carry home the news to many people where it could not be brought with all the fullness that it would be brought by joining with the women. The Indiana Union of Literary Clubs will hold its convention at Winona, in October. Every woman who goes there is a delegate, and she is expected to report every single thing of value to her club. If we could have these displays at these conventions, where we are watching eagerly for all of the newest things, this knowledge would be carried all over the State, and I thought that it would furthermore decrease the expense for the gas men and add very much to our knowledge. I am sure I thank you all for your courteous appreciation. I was talking to the President of the last State convention that I attended, and he said that he sometimes felt a little worried when he saw the attention lag somewhat, but he thought of the minister who was preaching rather a stupid sermon to people who were trying to look bright, and he felt like saying, "If you think this is easy, do it yourself." So I felt just a little this way in facing all the gentlemen, and sometimes I find it rather hard to tell all my feelings that have been accumulating for 17 years for the gas fraternity; but I thank you. (Applause.)

(To be Continued.)

THE Citizens Mutual Gas and Electric Light and Power Company is seeking a franchise to operate in San Antonia, Tex.

[Official Report—Continued from Page 981.]

TWENTY-SECOND ANNUAL MEETING, OHIO GAS LIGHT ASSOCIATION.

Held in Cincinnati, O., March 21, 22 and 23, 1906.

Second Day—Morning Session.

The paper by Mr. J. M. Robb, of Peoria, Ills., is as follows:

INSTRUCTIONS TO GAS DISTRIBUTION EMPLOYEES.

General.—1. Rules serve the same purpose as the pipes used to convey gas; they direct the energy for which the company pays wages and salaries to the point where it will do effective work.

2. It is painfully apparent to the man who thinks, that the energy men should give in return for their wages is as volatile as the fluid we make and deliver to our consumers, and that the leakage, or difference between the amount paid for and that actually converted into useful work, is appalling.

3. This leakage is not necessarily wilful waste. It is mostly due to the lack of intelligent, concerted, concentrated and united action on the part of individuals who make up any given working force.

4. Every right minded man strives to prevent waste. So far as it concerns this company's work, it must be stopped. It is the purpose of these rules to prevent it and to indicate the lines along which every member of our working force must work, to the end that the whole force shall act together as a unit, with one common object in view.

5 Team work is as imperative in our working force as in football. Perfect work will be possible only when each individual not only does his own work, but backs up the work of his fellows as well.

6. Now, the object of this company is to earn dividends for the people who have invested their money in it; to earn dividends not only to-day, but to-morrow, next week, next month, next year, and all the following years, as long as the company shall be in existence. To do this, every economy must be practiced, every waste must be stopped, and above all and every other consideration, the service we sell to our consumers must be the best that their money can buy anywhere on earth. It must not only be this, but each and every consumer must be made to feel that he is considered as one of the owners of the business. That, as it is his money which pays the company's dividend and the wages or salary of every employee, so is his business entitled to every attention, consistent with justice to all the consumers as a body, from every person connected with the company in any capacity.

Our Consumers the Most Important Part of Our Business.—7. A little thought will make clear to any man capable of thinking why so much emphasis is placed on the necessity for courteous treatment to consumers, To say the least about it, you would think advice to be courteous to our manager to be superfluous. Yet, are not cusumers of more importance than the manager, since, if we could not secure the consumers, we would have no use for him?

8. Courtesy is just consideration; putting yourself in the other fellow's place, and seeing things or trying to see them, through his eyes. When you have money in your pocket and go to buy goods, you expect, and rightfully, too, the merchant to show his wares to you, answer your questions and make an effort to please you. A little of this same spirit on the part of every member of our working force will make every consumer on our books a friend for life; establish our company the most popular institution in this community and exterminate the kicker.

9. The early gas men maintained that a gas company's money was either made or lost in the retort house. Modern business methods aiming more and more to give the man who pays the money what he desires, when and where and how he wants it, have so changed conditions that now a gas company's fortunes are made by its distribution department.

10. Every man's house is his castle. If distribution men will only bear this in mind, the chances for friction with our consumers will be reduced to almost nil. When, in your work, you find a consumer's house closed, do not attempt to enter it unless your instructions on your orders provide for getting the key, or applying to some person for admission.

11. If you are to secure a key, learn, when getting it if the house is furnished.

12. If unfurnished, secure the key, complete your work and return the key to where you got it.

13. If the house be furnished, ask for someone to accompany you to remain at the house until your work is completed. Should your request be refused, telephone the office for instructions and do not proceed with the work until you get them.

14. Whenever, in the course of your work, a consumer's gas is cut off by reason of it, you must exert every effort to get it turned on again with the least delay. Work overtime if necessary to do this. Remember that our business is to sell gas, and the best way to sell it is to always and at all times have it ready for every consumer who wants to use it.

15. Always go to the rear door of any house your work requires you to enter. If the work makes it necessary to use the front entrance, secure the consumer's permission first.

16. Always ring or knock and wait for the consumer or occupant to admit you.

17. Always clean your feet before entering. If cleanliness is more godly at one time than another, it is when you are working upon a consumer's premises. A little care will save a yard of complaint.

18. Never force or push your way into a house against the will of the occupant.

19. Always upon entering a consumer's premises, clearly state your business. Let your manner tell him as plainly as possible that as it is his work you are going to do, you want to consider his wishes in performing it.

20. Avoid at any cost any trace of officious importance in your dealings with the consumers.

21. If your work requires you to ask an accomodation from a consumer, as, for instance, to use his telephone, don't f orget to thank him, no matter how insignificant the favor may seem to you. Expressed appreciation will mollify the most crabbed human nature.

22. It must be clearly understood that every employee will be expected to see that any promise made to a consumer is fulfilled. It should be a matter of personal pride with employees that every agreement made, be kept to the letter, and to this end you must not make nor imply a promise to a consumer unless you are certain that the promise can be fiulfilled.

23. Whenever a consumer desires you to postpone work you are instructed to perform, telephone the office for instructions Needless to say that this rule does not apply to cut-off orders for non-payment.

24. Whenever your work requires consumer's property of any description, to be moved, you must see that it is replaced in the same condition as you found it.

25. Whenever you find a consumer's property in such bad order that your work is liable to further damage it, before proceeding call the consumer's attention to the trouble, being careful to have a witness to your conversation. If the consumer is unwilling to have you proceed with the work at his risk, telephone the office for further instructions. In any event, it is imperative that you make a written report of the matter, stating the whole situation clearly, on the back of your order. Always give the name of your witness.

26. Never in your work open or shut any water valves. The only exception to this rule would be when connecting or disconnecting gas apparatus also connected with water pipes.

27. Should you, unfortunately, be the cause of any damage to any consumers' property, report such damage to the office by 'phone at once, and make a full written report on the back of your order afterwards. Accidents will happen. Damage caused by carelessness or neglect will be charged to the employee responsible, but promptly reporting such damage, and energetic action to get it repaired with the least inconvenience to the consumer, will count more than anything else in having the fault passed over.

28. Always clean up after completing any work for a consumer. No matter how untidy the consumer's premises may be, clean up any *debris* or litter resulting from your work. Neatness and well ordered habits are one of the surest indications of a man's competence in his work. They will go further in fixing a favorable opinion of us and our methods in our consumers' minds than yards of verbal expression of goodwill.

29. It is imperative that you never, under any circumstances, use or appropriate in or for your work any property or tools not owned by the company. Human nature has many curious phases, and some of it seems to lie awake nights to find an opportunity to claim damages. Take no chances and you'll have nothing to regret.

30. We want all of our employees to be men—strong men. One of the best evidences of strength is the ability to withstand abuse without returning it. Unfortunately, some of our consumers lose their tempers easily and become abusive. The right kind will always be sorry for it afterward. The other kind need not concern you. Be strong enough not to bring yourself down to the level of an abusive consumer by returning in kind.

31. Never under any circumstances make any comments, favorable or otherwise, about a consumer's gas appliances or anything in his

premises. Some people have a wonderful faculty of misunderstanding. When you are on a consumer's premises play safe. Least said, soonest mended. Now, this does not mean that you are not to answer questions. Every consumer is entitled to the fullest information you can give him about the part of his business which you are handling. It is part of your work to answer questions. Don't, however, volunteer information. Speak when you are spoken to, and then be sure you are right before you go ahead.

32. Never eat your lunch or hang your clothes in conspicuous places. We are as proud of our working force as we can be, but some of our consumers have æsthetic tastes, and it is just as much our business not to offend them as it is to give them better service than they can buy anywhere else. You'll have to admit, anyway, that a man absorbing the contents of his lunch box, or his old coat hung on the front fence, never add to the beauty of any landscape.

33. Politeness and courtesy always pay big dividends. Anyway, we hope that our consumers will always have pleasant thoughts when they see any of our boys. It's a mighty poor advertisement for us if your appearance anywhere causes somebody to put on a frown and think "damn."

34. Nearly all the suspicion of gas company methods has its foundation on gas company employees' lack of consideration, and it is up to us to prove to the public that we take as much if not more pride in serving our consumers well and honestly as any other institution that ever existed.

35. When it happens, as it sometimes unfortunately does, that for the protection of the company's interests action must be taken to which the consumer objects, as when gas must be cut off for non-payment of bills, a little consideration on your part will prevent the consumer from taking offense. At such times let your manner clearly show that while you are in sympathy with the consumer's predicament the importance of the interests you are serving demands the action you are performing. Let your manner be conspicuous for the absence of any personal feeling, so that the power which is behind you will be plainly evident, and your earnestness will convince the consumer that you have no choice but to carry out your orders.

36. Be especially careful to report on the back of your order any statement which the consumer may make to you.

Our Employees Next in Importance to Our Consumers.—37. The business of supplying gas is one of the most important in the world, and this importance is increasing daily. The comfort and convenience of the greater proportion of the inhabitants of every city are becoming more and more dependent upon the use of gas. Our business offers to men of ability and capacity for assuming responsibility as magnificent opportunity as any other. Any man in the gas business who fails to recognize this has plainly missed his calling and he owes it to himself to change either his point of view or his occupation without delay.

38. The man with a "what-I-can't-do-to-day-I'll-do-to morrow" disposition has no place in any gas company's distribution department. The nature of the service, to give our consumers gas when, where and how they want it, demands men of "do-it-now" dispositions; men who will in an emergency stick to a piece of work until it is finished, without any regard to the clock.

39. You are earnestly urged to consider carefully Bishop Spalding's definition of success: "Success lies in never tiring of doing; in repeating and never ceasing to repeat; in toiling; in bearing and observing; in watching and experimenting; in falling back on oneself by reflection, turning the thought over and over, round and about the mind and vision, acting upon it again and again—that is the law of growth. The secret is to do, to do it now, not to look away at all." Applied to our work by everyone of our boys, this will increase the efficiency of our working force until it is equal or superior to the best in the world and will make every man in our employ the success he should be.

40. While these rules are intended to serve as pipes to convey without waste the energy paid for in wages and salaries to the point where it is to be used, the utter impossibility of laying down hard and fast rules for every part of our work is recognized. Plenty of opportunity will arise for even the humblest member of our working force to exercise his own judgment.

41. Familiarity with these rules and actions at all times, in accordance with the spirit of them will, however, be considered as the first essential for continuance in our employ.

42. It is assumed that all of our people are gentlemen, who know how to respect themselves and appreciate and are willing to give to the company the loyalty and support which they owe it.

43. Every employee, from the president to the man in the ditch, has his proper share of responsibility, and it is our earnest desire to give everyone of our boys the same considerate treatment we expect from them.

44. If you consider that you have a grievance, take up the matter with your superior officer, or the superintendent, and it will be as carefully considered as conditions will permit. Don't nurse it, at any rate. Have it out or get out.

45. Suggestions for the better conduct of our business, and criticisms made in the spirit of helping to improve our work, will always be gladly accepted. They will be considered as giving evidence of an employee's fitness for greater responsibility.

46. The address of every employee must be filed at our office, together with information for reaching him quickly outside of working hours, should an emergency require. Every employee must report in writing to his foreman or immediate superior any change in his address. With a business like ours, an emergency requiring the presence of every employee may arise at any time. It is only common business prudence to be prepared to act quickly in case occasion requires.

47. Punctuality is a most important requisite in our employees. There is no difficulty in enforcing punctuality in the hours of leaving off work. There should be none in the hours of commencing. The man who is careless about being on time is usually just as careless about other things. Punctuality at all times is insisted upon.

48. When circumstances require your absence from work, be sure to send notice to the office. To the man who has a proper regard for the value of his own services this rule will not be necessary.

49. The use of tobacco or intoxicating liquors is forbidden during working hours. Smoking is dangerous in any part of our work. Chewing, with its accompanying expectoration, is repulsive to our consumers, and the slightest odor of liquor about a man is sufficient to condemn him in the eyes of many people. A proper understanding of all of the requisites of the service which we are selling to our consumers will convince any man of the absolute necessity for this rule.

Our service includes careful and considerate attention from every person connected with the company to every want that has a legitimate bearing on or connection with his supply of gas of every consumer.

It surely includes handling his work with decent, clean-mouthed men, who will not excite his suspicion of their competency to successfully perform his work.

50. Make an effort to convey by your manner an impression of strength in dealing with consumers. Nothing will do this better than a low, even tone of voice. Most men, when they are not sure of themselves, speak loudly or use cuss words. Keep a good grip on yourself and you will always have a strong hold on your work.

51. No employee, not properly authorized to do so, can accept money owing to the company. Should a consumer desire you to accept payment for any bill explain to him that your instructions positively forbid you to do so.

52. Vacancies will always be filled solely with the idea of securing the best results. Only capacity and fitness for the work will be considered. Long service alone never entitles a man to promotion. Other things being equal, the oldest employees will always be given the preference, but no employee need expect advancement unless he has made an earnest, persistent effort to fit himself for the duties of the higher position.

53. No man can know too much about his work. Our officers are always ready to answer your questions and to give you every possible help in increasing your knowledge of our business. The man without the ambition to advance and the willingness to pay the price of such advancement, is as dead as though he were buried. We do not want any animated corpses in our employ.

The *Philistine* says: "Every employee pays for superintendence and inspection. Some pay more and some less. That is to say, a dollar-a-day man would receive $2 a day were it not for the fact that someone has to think for him, look after him, and supply the will that holds him to his task. Make no mistake about this; incompetence and disinclination require supervision, and they pay for it; no one else does. Do your work so well that it will require no supervision, and by doing your own thinking you will save the expense of hiring someone to think for you."

54. Employees are expected to keep themselves posted upon all of the company's advertisements. It surely does not look well to you if, when you ask a clerk in a store for information concerning one of the store's advertisements, he tells you he knows nothing about it. Apply this to our business. Copies of our advertisements will be kept posted on our bulletin boards, and the employee who fails to keep himself informed of them, so he can answer questions of consumers or intending consumers, will be considered so lacking in interest in the company's welfare as not to be worth longer employment.

55. Always wear your badge during working hours. We want to get together such a fine looking lot of fellows that every person in town will, when they see one of you, know at once where you belong. If you have a sort of sneaky, hang-dog feeling about wearing your badge, you want to lose either the feeling or your job right off. We aren't ashamed of having you with us, and we aim to treat you and everybody else so well that it will be a credit to you to let people know you are connected with such a solid and square dealing institution as ours.

56. It is most important that the office be in constant touch with all superintendents, foremen, inspectors and complaint men. Use the telephone for this. Call up at least twice each day and always before moving from one locality to another.

57. Employees must be careful not to give out information which solely concerns the company. Do not discuss the company's affairs in public or in any place where you are likely to be overheard. The very walls seem sometimes to have ears. While there is nothing pertaining to our work which we fear to have known, a little information is a dangerous thing for some people. A little wholesome silence will save much troublesome explanation.

58. Excepting only consumers asking questions concerning their immediate business which you are engaged upon, inquirers must always be referred to the office, the proper place for transacting the company's business. Nothing in the above will excuse any incivility to the general public. The most valuable asset this company can ever possess is the goodwill of the public. Therefore, every employee must strive at all times to have his manner give the impression of goodwill to all men, without giving the thoughtless or ill-disposed an opportunity to trespass upon the privileges to which we are rightfully entitled.

59. While helpful criticism will always be welcomed, be sure it is helpful before you make it audible. Anybody can tear down a house. It's a difficult matter to build one. Be certain, too, before you venture to criticise a method or an order that you fully understand its purpose and realize its bearing upon the whole work. No officer of this company is issuing orders or devising methods just for fun. Every order or method is designed for some particular end, and often when this end is understood, no foundation for criticism can be found.

60. Employees who make assignments of their wages or salaries, or who subject the company to garnishment proceedings, cannot be members of our working force. Assignments or garnishments are usually sure indications of loose habits of living, which unfit a man to produce good work. The great importance of our work forbids our using any but men of the best habits. Every effort will be made to protect faithful employees who meet with misfortune, if they will acquaint us of their trouble in time to help them.

Orders.—61. The necessity for keeping for future reference a record of all work done, and the number of people in our employ whose work is concerned by such records, makes it clear why every piece of work must be covered by a written order.

62. If an emergency requires you to do a piece of work upon a verbal order, or without any order at all, always see that a written order is made out to record what you have done.

63. The importance of these records to the successful conduct of our business makes it imperative that every bit of information called for by our orders be filled in on them by the man who performs the work they cover. When our order forms are designed, some especial object is to be accomplished by each item of data requested. You are not to think that because your reports are accepted with certain blanks not properly filled in, that you are excused from supplying the requested information. Many times the press of work prevents proper scrutiny of reports and the omitted data is not noted until occasion arises to use it.

64. Always perform your work in strict accordance with your orders, paying careful attention to any especial notes written on them.

65. Never erase any information given on an order, it is highly important that all our records be complete, and no employee is entitled to assume that any data given on an order will not be required.

66. The right minded man will know without being told that the orders he fills out constitute the original records which are the basis of all our records and reports. He will, therefore, take as much pride in making the reports clear and complete, and in keeping them clean, as he does in properly performing his work.

67. It is most important that orders be properly filled out immediately after the work is completed. They must be filled out on the job, not from notes taken there and afterward copied. Orders must be promptly returned to office as soon as work is completed.

68. Never abbreviate the information which should be reported abont a piece of work for lack of space upon your order. If necessary, complete your report upon another blank of the same size as the order itself and attach the blank to it.

Material.—69. The material handled by our distribution department represents the expenditure of an enormous sum of money each year. The most insignificant waste may reach an appalling sum before it is discovered. Every man on our pay roll must constitute himself a committee of one to effect an ecomomy in the use of material.

70. No material must be taken out from our storeroom unless it be required by the work you are performing.

71. Every bit of material used must be charged out on your orders, so that its cost will appear against the work on which it was used.

72. You must see that every bit of material remaining after the completion of your work is returned to our storeroom. If it is impossible for you to return it promptly, you must protect it from being stolen or damaged, and send a written order to the office to have it returned.

73. You must always carefully preserve driver's duplicate receipts for any material purchased and delivered direct to you on your work, and after O. K.-ing them, return them to the office promptly. Always note date received on such receipts and sign your name to them.

74. Every employee must make a written report to the office of any company material which he learns is liable to be lost, damaged or stolen.

75. No employee is allowed to purchase any material on company account, except on a written order signed by the proper official. If an emergency requires you to purchase material, always see that your purchase is covered by a confirming order. No bills for material will be paid unless they bear the proper order number and have been O.K.'d by the purchaser and the person receiving the material.

Tools.—76. The company will furnish all the tools required to carry on any piece of work, and it will be your first duty to make the proper requisition for such tools as you may need to perform your work properly.

77. To prevent loss you must sign a receipt for the tools furnished to you. These tools will then stand charged to you, and in the event of your leaving our employ their cost, unless they be returned, will be deducted from the wages due you.

78. Tools worn out or damaged in service will be replaced, but tools lost will be charged to the employee responsible for them.

79. Do not work with worn out tools. It wastes expensive energy and makes good work difficult, if not impossible.

80. Keep tools in your charge clean.

81. Employees in charge of wagons, service carts, etc., must clean them as often as necessary to give them a well kept appearance.

82. Do not lend tools. Tools represent the company's money, and they should be treated with the same care that you give your own.

83. Foremen must see that all street tools are properly cleaned and stored in tool box each night.

84. Drivers must never leave their horses untied, even for a few minutes. The steadiest horse may sometimes be startled unexpectedly, with disastrous results, so take no chances.

85. Bear in mind the purpose of tools and the great importance of properly caring for them will be clear to you.

Danger of Explosion.—86. A gas man must never forget the danger of an explosion.

87. No fire must be used on any repair work, for thawing frozen ground, or for any other purpose.

88. Smoking is especially dangerous and is forbidden on this account.

89. Never attempt to find a leak anywhere with a light or apply a flame to light the escaping gas.

90. Leaks must be located either by the sense of smell or the use of soap suds.

91. Never use matches or take an unprotected flame into a building. The company provides safety lamps for work where other lights will be dangerous.

92. Gas escaping through the ground has been known to be deodorized. There is only one rule to be followed with regard to fire or lights where there is the least possibility of gas being present, and that is most imperatively, DON'T.

93. Whenever you suspect a gas leak, immediately extinguish all open flame lights or any fire there may be in the neighborhood.

94. Whenever the odor of gas inside a building is reported to you, endeavor first to ascertain if the gas is escaping from the apparatus inside the building, or if the gas is leaking into the building from the soil outside, or from adjoining premises. If the odor of gas is very noticeable, immediately open the windows to ventilate the premises. After making certain that no gas is being used in the premises, examine the

test dial of the meter or meters to see if any gas is being passed. If no movement of the hand on a 2-foot test dial can be detected for 10 minutes, with the gas pressure on the meter and no gas being used, it can be safely assumed that there is no leakage in the house piping and fixtures. If the hand on the test dial moves in this length of time, with no gas being used, endeavor to locate the leak. If you can find it, and it can be readily repaired, remedy the trouble. If it cannot be repaired at once, or if the leak is in apparatus which the consumer should stand the expense of repairing, soap up the leak temporarily and notify the consumer that you will have the trouble remedied, or tell him to get a plumber, as the case may be.

95. If gas is coming into the building from without, inspect the adjoining premises, if the house is one of a block, or notify the office at once if you suspect the leak to be in either the service or mains in the street.

96. Never, under any circumstances, leave a leak until you have remedied the trouble, unless you are absolutely certain that it is of the most trivial character, or have made absolutely certain the impossibility of an accident.

97. In the case of a broken main, accompanied by the escape of a large volume of gas, the convenience of some of the consumers must be sacrificed. Locate the break as closely as possible from observations at the places where the escaping gas is noticed and then bag off the section of the main in which the leak is located.

98. Leaks of this description are exceedingly dangerous and work must not cease until they are located and remedied.

99. Do not hesitate to warn smoking bystanders or loiterers where repair work, in which gas is escaping or likely to escape, is being carried on.

Asphyxiation.—100. Whenever a man has been overcome with gas, it is the result of carelessness. A few simple precautions will prevent anybody from being gassed. As accidents will happen, however, these rules are given, so that in the event that such an emergency should arise, you may know just what to do.

101. Asphyxiation is the suspension of the vital functions from causes affecting the respiration or breathing.

102. As long as the victim has not lost consciousness there is little cause for alarm.

103. The first thing to do is, of course, to give the victim plenty of fresh air and then call a doctor. If he is able to move, keep him walking about, as the exercise helps the respiration.

104. Give the victim a glass of weiss beer, vichy water or any other carbonated water, or, if these are unobtainable, give him a pint of water in which a teaspoonful of baking soda has been dissolved. If he is very weak, give him 30 drops of aromatic spirits of ammonia and repeat the dose every 5 to 15 minutes, until 4 doses have been given. If more than 4 doses be given the patient will be nauseated.

105. If the victim has lost consciousness, lay him on his back, with a tightly rolled coat under his shoulders, in order to throw his head well back. Open his clothes at the throat, chest and abdomen. Roll up the trousers from the legs. Supply heat to the extremities, either by vigorous friction or by hot bricks, hot water bottles, plates, etc. Pull the tongue out of the mouth and hold it firmly to prevent its slipping back and falling into the throat. Make the victim breathe by kneeling at his head, grasping his arms at the elbows and pressing them vigorously to his sides; then straighten the arms, pulling them back until the hands meet over the head; then return the arms to the sides, fold them across the chest, pressing them down hard. Repeat about 4 or 5 times a minute, being careful not to make the motions too rapidly. The sole object of the motions is to fill the lungs with air and empty them in imitation of the natural breathing.

106. During the entire process of artificial respiration, have your assistants apply heat to the extremities, either by friction or by hot water bottles, bricks, plates, etc., and slap the chest with a wet towel.

107. The restoration of asphyxiated persons has been accomplished at long periods after apparent death, so be prepared to continue your artificial respiration until a doctor pronounces the victim dead.

108. The work, to be effective, is very tiresome, and 10 minutes at a stretch is about as long as one man can administer the treatment effectively. On this account change operators before their strength is spent.

109. When the victim begins to breathe naturally, give him a dose of aromatic spirits of ammonia, as before directed, and cover him up warmly until you can move him.

To Prevent Asphyxiation.—110. Never work on leaky gas mains, or do work on mains or services in which gas must be allowed to escape, until the trench has been made large enough to thoroughly ventilate it and afford ample working room.

111. Never do such work in tunnels or under the overhanging banks of trenches, unless you are specially instructed to do so by the superintendent and you are working under his guidance.

112. When performing such work, always station a man on the bank to keep the workers in sight and get them out of the ditch promptly, if necessary.

113. Every gang on such work must be provided with life belts and a rope long enough and strong enough to pull the men out of the trench.

114. Never enter a house or building filled with gas without first providing the means for getting out quickly in case you are overcome. You can do this by attaching a rope to yourself when you enter and leaving the other end in charge of assistants, who can then get you out, if necessary.

115. These precautions may seem unnecessary to you, but you must remember them and use them should an emergency arise. Human life is precious, and must not be exposed to danger heedlessly.

Complaints.—116. If there is any one division of gas distribution work that is more important than others, it is that which cares for consumers' complaints.

117. A good complaint man is a treasure worth his weight in gold to any company. Our complaint men make either friends or enemies for us. There is no middle course.

118. Do not consider from this that there is any difficult or complicated about complaint work. It is just as simple as getting gas through a straight line of pipe, if you have an ample supply at the end from which you want to take the gas.

119. Just think to yourself, when you are called upon to remedy a complaint of no gas, or poor gas, the consumer's apparatus. from the main to the last burner, as a straight line of pipe, each burner or appliance representing a tee in the pipe, and the meter outlet, meter inlet and service pipe, other tees.

120. With this idea in mind, you will have no difficulty in locating the consumer's trouble. All it requires is a little patient observation. The first thing to do in caring for a complaint of poor gas is to question the consumer, or the occupants of the premises for which the complaint has been made, as to the precise nature of the trouble complained of.

121. Evidently, if the consumer is having trouble at all of his burners and appliances, represented by the tees in the imagined straight line of pipe, the trouble can be found in the line between the tees representing the meter outlet and the meter inlet, service pipe or main, unless the trouble is in the main itself.

If you cannot gain intelligent information by asking questions, then light up the consumer's burners or appliances and make your own observations. Always endeavor to light the same burners and appliances as are in use when the consumer most notices his trouble.

122. If there is a uniform lack of pressure throughout the burners and appliances, with an apparent increasing drop in the pressure as each succeeding burner or appliance is turned on, then a stoppage of solid matter at some point in the piping, or piping that is too small, would be indicated.

123. In this connection, a pocket siphon gauge to indicate the pressure at the several points in the piping, will be of great assistance, although with a little practice the drop in pressure will be plain to the eye from observations of the flames in the various burners and appliances.

124. A quick, sharp jumping of the flames would indicate a stoppage caused by a collection of liquid at some point in the piping.

125. A slow, regular rising and falling of the flames at frequent intervals would indicate a meter overloaded or sticking at some point.

126. If the trouble is found only at one point, evidently it is in the branch pipe supplying the apparatus where the trouble is found, or in the apparatus itself. In this case the trouble is easily located by patiently examining the appliance and piping step by step until the stoppage is found.

127. If the trouble is common to all of the burners and appliances, then first remove the plug from the tee in the service where it enters the building.

128. If the trouble is caused by water or liquid in the service pipe, it will be made plain to you by the gurgling sound or the intermittent flow of gas when you remove the plug. Never, under any condition, allow any condensation from a service to escape into a consumer's premises. To permit this is to create as great a nuisance as though you had given a polecat the run of his house.

129. If the trouble is caused by a stoppage in the service, the lack of velocity or force of the flow of gas, or the small volume of the flow, will tell the story to you when you remove the plug, or, you can detect it by applying your mouth to the tee and blowing into the service pipe.

130. If the stoppage is in the service pipe, clear it by pouring gasoline or naphtha into the pipe and then blowing into it with your lungs, or, better still, with your service pump. In forcing a service with your pump, always make sure that all meters connected to the service are shut off. After forcing a service with a pump, always light up the consumer's burners or appliances to remove the air blown in the service pipe.

131. If this fails to remove the trouble, then rod the service pipe with a wire.

132. This failing, make an examination of the service pipes in neighboring houses to make certain that the trouble does not exist in the main. If you find these services in good condition, then order the service pipe dug up.

133. Always make a complete separate written report on any service in which you discover water or condensation, for the guidance of the service men.

134. If you find the service pipe clear, then examine the meter inlet and the meter outlet, paying special attention to the connections, to ascertain that they are not flattened, so that they obstruct the flow of gas.

135. Be patient and persistent and you can locate the most obstinate case of trouble.

136. Never assume that a consumer's complaint is imaginary. Consumers do not make complaints just for fun. Their is some foundation for their reports of trouble and it is up to you to find it and prevent the recurrence of the complaint. If you can't locate the trouble, don't be afraid to tell the consumer so, but be sure to tell him, too, that you will get assistance and keep after the matter until the trouble is remedied.

137. It is a lot better for us if you can only remedy one complaint a week, if you stop the trouble so that it will not occur again, than if you make a hundred calls a day which you will have to repeat again in a little while. Frequent repetitions of the same trouble will sour the best natured man in existence. Our consumers are paying us for good service and we are paying our complaint men to give careful attention to our consumers' troubles and to remedy them to stay remedied, when it is our work to do so.

138. If you cannot locate the source of a consumer's trouble, after a careful and painstaking investigation of every bit of his apparatus, put on a recording pressure gauge for a few days to get a record of actual pressure conditions in his apparatus.

138. Do not take down a consumer's chandeliers or gas brackets unless especially instructed to do so.

140. If you locate a stoppage in the consumer's piping, be especially careful in endeavoring to force it out, that you do not make matters worse.

141. When you find a stoppage in a consumer's piping that you cannot force, inform the consumer of the location of the stoppage and request him to have the piping opened up to be cleared. In such cases, make a special written report to the superintendent, stating exactly what the trouble is, what you have done to remedy it, and what you have advised the consumer to do.

142. In forcing a consumer's piping, first disconnect the meter outlet and bend the connection to catch in a suitable receptacle any matter which may be blown out of the piping. Attach your pump to the first opening from the meter and give the piping a shot, then proceed to the next opening and so on, until you have cleared the whole piping.

143. In a case of a stoppage in a consumer's piping, difficult to dislodge, the trouble may sometimes be remedied by filling the piping near the point of stoppage with gasoline, allowing the gasoline to stand several hours, and then forcing the gasoline out with the service pum .

144. Do not hammer old piping to loosen scale, rust, etc. It is dangerous for you can never determine what defects such hammering will develop.

145. Pay especial attention to the consumer's burners when attending complaints. Always put on new tips wherever necessary and explain to the customer that tips, like everthing else, need attention at times. If the consumer is using open flames with glassware, always put on Bray burners, so that no complaints of cracked globes will come in. The complaint man who permits ragged open flames to pass in his work is guilty of gross carelessness or ignorance.

Naphthaline Complaints.—146. Frequent complaints from naphthaline inside the premises, from any consumer, are almost invariably the result of some bad condition in his service pipe, extension, meter, or meter connections. The cause will almost always be found at some point where the flow of gas is restricted. It may be in too small a service extension, too small a meter, too small connections, flattened connections, service pipe or meter exposed to chilling drafts, or great variations in temperature, or something similar. The cause will be made plain by a little patient study. Successive complaints from naphthaline stoppage inside a consumer's premises stamp a complaint man as careless in his work.

Frost Complaint.—147. Make a complete written report upon all services or consumers' piping found stopped by frost.

148. A shot of wood alcohol will in nearly every case free a frosted service, but frosted services are, as a usual thing, the result of bad work and it is up to us to prevent their recurrence in another winter, unless conditions in the consumer's premises are so bad that the trouble cannot be remedied.

149. When frost trouble is found in the consumer's piping, make a complete report with diagram, if nec ssary, of what changes are necessary to stop the trouble, so that the consumer can be advised by mail that it is up to him to provide the remedy, and at the same time he can be informed just what he should do.

High Bills.—150. It is not the work of the complaint man to explain high bills to consumers, but he can help in preventing them by carefully teaching consumers, whose complaints he attends, how to read their meters and how to prove their gas piping is tight, by observing the hand on the test dial of their meters when no gas is being used.

151. Endeavor to induce the complaining consumer to keep a record of the gas he uses each day.

152. Emphasize the fact that consumers who read their meters regularly, at frequent intervals, and know from actual measurement just what gas they use, never have to complain of high bills. It's only the waste that makes excessive gas bills, and if grocers, butchers and such people, sold their product by the month, with payment after the stuff had heen consumed, their complaints would be far more numerous than any gas company's.

153 When a consumer calls your attention to a complaint of a high bill, always make a note of it on your order, together with the number of the consumer's meter and the statement at the time the complaint was made. This will show consumers that their complaints are at least not falling on deaf ears and your statement will be of great assistance to the office in checking up the consumer's complaint.

Leak Complaints.—154. In investigating complaints of leaks you must report: The location of the leak. State definitely whether it was on the outlet or inlet side of the consumer's meter. If in the meter itself, did the meter register the leakage. And finally, how much gas was leaking, as determined by timing the movement of the hand on the test dial of the meter at least 10 minutes, together with the statement and number of the meter.

155. A leak complaint is almost invariably followed by a claim for an allowance for gas lost. This is especially so if the leak is found in work installed by the company, such as a stove line, or the meter connections.

156. All of the information asked for, is required, either to satisfy the customer that he is not being overcharged, or to make him a just allowance, if he is entitled to any.

157. Do not use matches or candles to hunt for leaks. Brush the joints and piping with soap suds, smell along the piping, or pass the fingers over it, listening for the hiss of escaping gas, if the leak is a large one. One part gas in 60,000 parts air can be detected by the sense of smell. One part gas in 7 parts air forms an explosive mixture.

158. Any leakage which causes the movement of the hand on the test dial in less than 10 minutes, should be considered serious and the gas should be cut off.

159. A consumer's piping and fixtures may be quickly tested for leakage by removing the meter and setting in its place a test bottle. The test bottle is so arranged that any gas passing through it must bubble through the water contained in the bottle. The rate of leakage is indicated by the rapidity with which the bubbles of gas rise through the water, and the piping is proved gas tight if no bubbles appear.

160. The consumer can usually assist in locating the leak if you will question him.

161. Examine carefully all exposed gas piping and all fixtures and appliances. If you cannot locate the leakage this way, trace out the probable location of the gas piping from the location of the fixtures and carefully smell along any cracks in the flooring or along the baseboards, or at sliding door openings near the piping.

162. If you can locate the leak and it is in the consumer's apparatus, advise him and request that he get a plumber to repair it.

163. If an inspection fails to locate the leakage in a consumer's apparatus, advise him and request him to get a plumber to locate and repair it.

164. If you find the leakage and are unable to make permanent repairs either because it is in the consumer's apparatus and should be remedied by him, or because you must secure proper material, soap up the leak and advise the consumer, either that he must effect the proper repairs, are that you will return to do so.

165. If you find gas coming into the house from the street, open the basement windows for ventilation and immediately telephone the office for instructions. If you find the gas entering the consumer's premises from adjoining premises, carefully examine the piping there. When you have located the leak, repair it, if you should do so, in accordance with the foregoing instructions, or cut off the gas and notify the consumer responsible for the premises, to effect the required repairs.

166. If you find gas coming from a vacant or closed house and cannot locate the custodian, call a policeman and have him force an entrance, or 'phone the office for instructions.

Regulating Gas Stoves.—167. The proper way to adjust or regulate a Bunsen, or atmospheric burner, is to open wide the air mixer and then cut down the gas supply with the gas regulator, if there is one, or by closing up the orifice that admits the gas to the mixer, if there is no gas regulator, until just enough gas is flowing into the burner to prevent it lighting back.

168. The proper flame in a Bunsen or atmospheric burner is one in which each separate jet at each hole seems burning alone by itself, not impinging or touching at any point the jets adjacent to it, and burning with a greenish cone in the center of the jet; the cone having the appearance of a vigorous swirling motion, as though the envelope of flame was endeavoring to force the green cone down through the hole from which it issues.

169. Should a consumer insist upon having a large mass of blue flame above his burners, demonstrate to him the better efficiency of the flame just described, by heating to the boiling point a small pan of water over the flame he wants, carefully noting the time required, and then repeating the operation with the same quantity of water over the burner adjusted as you are above instructed, again noting the time.

170. Always explain to a consumer the necessity for keeping all burners and appliances scrupulously clean.

171. If burners are badly incrusted with grease, they can be cleaned by boiling in strong lye water, or, in very bad cases, by heating to the point of redness over a fire. In heating burners to clean them, extreme care must be used to prevent them overheating, or they will be ruined.

172. The tops of stoves can best be cleaned with gasoline applied with a stiff scrubbing brush. In using gasoline, remember that because of its extremely volatile nature it is far more dangerous to handle than gas. Never use gasoline in a room where there is a fire or an open flame of any kind. Never light a burner in, or take an open flame into a room where gasoline has been used until the room has first been thoroughly ventilated.

173. An excellent stove cleaner and polish is made as follows: Dissolve 2 ounces of beeswax in 1 quart of gasoline and then add ¼ of a pint of turpentine. Shake well before using. Give this formala to every consumer whose gas stove you inspect.

174. In cleaning and adjusting gas stoves, never neglect to remove the dust and lint which collects in the air mixers.

175. Complaints of ovens burning on the bottom may be caused either by heating the oven too hot or by poor pressure in the oven burners. In the latter case, the trouble would usually be indicated by the unusual length of time necessary to heat up the oven.

176. Complaints of not baking on the bottom are usually caused by failure to evenly heat the oven before commencing baking operations and then placing the baking too high up in the oven.

177. Complaints of bad odor from gas stove burners are nearly always the result of too much gas in the burners. Cases have been known where inexperienced cooks lighted the burners in the mixers.

Water Heaters.—178. The instructions concerning the regulation of gas stove burners also apply to water heater burners.

179. In complaints of failure to heat, first examine the burner to ascertain that it is burning properly.

180. If the heater has been in service for a considerable length of time and the water used is impregnated with lime or other similar substance, a collection of sediment in the heater coils may be the cause of the trouble.

181. Too many elbows in the water connections or too long connections between the water heater and reservoir always make the circulation sluggish and good results in a water heater are dependent upon quick circulation, so that the greatest difference in temperature between the products of combustion from the gas burned and the water to be heated may be maintained.

182. Unless there is a constant upward rise of the hot water connection from the water heater to the reservoir, with the hot water supply pipe to the house taken off from the highest point in the hot water connection, sluggish circulation will surely result from the air pocket formed by any different run of the hot water connection.

183. Complaints of bad odor from a water heater will always result unless the heater is connected to a flue with sufficient draft to carry off the products of combustion. Too much draft will mean wasted gas, because of the excess amount of cold air drawn through the heater.

184. Complaint of improper working of an instantaneous water heater should always first be investigated by attaching a siphon gauge to the supply pipe and noting the pressure when the heater is lighted. Some instantaneous heaters on the market require 120 feet of gas per hour at a pressure of 15-tenths, to operate them.

185. Automatic instantaneous water heaters, heaters which are automatically started by the turning on of a hot water faucet anywhere in the house, require 200 feet of gas per hour and over, for their successful operation.

186. Complaint of water from an instantaneous water heater showing soot, usually requires the cleaning of the dust from the screens protecting the air openings in the burners. This complaint only arises from heaters in which the products of combustion come directly in contact with the water heated.

187. Whenever screens are placed over air openings of water heater burners of any type, they require periodic cleaning. If this attention is not given them, the burners will not receive sufficient air with the gas to be burned and inefficient operation, with the production of soot, will result.

188. The flue pipes of instantaneous heaters also require close inspection. They must be unobstructed and have sufficient draft to carry off all the products of combustion, without any probability of any down draft. As the products of combustion leave the heater at a high temperature, the outlet of the flue must not be near any inflammable material.

Incandescent Burners.—189. The proper manner to adjust an incandescent burner is, after burning off the mantle, to open the air shutter wide, then light the burner, giving it more gas than is required, as shown by the flame above the mantle. Then slowly cut down the amount of gas with the regulating device until the greatest amount of light is being obtained from the mantle.

190. Mantles deteriorate with use and the cause of poor light is often the use of mantles whose useful life has expired.

191. When putting on a new mantle, always examine the gauze cap. Dust frequently collects under the gauze and obstruct the free passage of the gas and air mixture. Clean the burner thoroughly before putting on the mantle.

192. Too little gas in an incandescent burner will make the light flicker and too much will cause a deposit of carbon on the mantle, blackening it.

193. Inquire of a consumer complaining of incandescent gas burners, the length of time they have been used. After carefully examining the lamps and finding no trouble, suggest the purchase of new mantles, if the old ones have been in use over six months.

194. It is highly important that the glassware on incandescent gas lamps be kept clean, in order to secure the best light from them. Call the consumer's attention to this if conditions make it necessary.

195. The above instructions apply to arc lamps as well as single burners. For satisfactory lighting service, good pressure, good mantles, clean burners and gauzes, and clean glassware, are absolutely necessary.

196. Careful attention to these points will remedy any reported trouble from incandescent burners or arc lamps.

197. To clean shades, ceiling plates and globes of gas arcs, apply whiting with a damp cloth and then rub to a polish.

Other Corporations' Property.—198. You must bear in mind constantly that other corporations have the same rigts and privileges in the streets that we do.

199. It is our policy to maintain the most friendly relations possible with everybody in this community. As a rule, whatever will injure another corporation's property will also injure our own. While it is not intended that you shall perform any of the work which should be taken care of by their own employees, we shall expect you to have a friendly interest in anything likely to result in damage to their property, which may come to your notice. In such an event, make a prompt report to our office. We should appreciate a similar courtesy

from other corporation's employees and we should certainly give others the same treatment we, ourselves, expect.

200. Whenever, in the course of any construction or repair work, and other structures in the street are endangered, every precaution must be adopted to protect them.

201. Unless it is made imperative by an emergency, never open or enter any sewer, water main or conduit manhole, except when an employee of the owner of such manhole is present.

202. Whenever, in the course of any work, any other corporation's property, such as sewers, water pipes or conduits, or the like, are opened up or exposed, keep a careful written record of their exact location and condition, together with a description of what you have done in disturbing or protecting them.

203. Forward your record promptly to the superintendent. It may be of the greatest importance in case of any claim being made for damages.

204. Never disturb or perform any work of any character on any other corporation's property, unless it is to protect such property from damage resulting from any work which we are carrying on.

205. Never disturb in any manner any land marks or stakes set for any purpose.

206. Always make to the superintendent a complete written report of any damage done to any structure or property of another corporation, stating clearly the cause of the damage and what steps, if any, were taken to prevent or remedy it.

207. Whenever any of our work necessitates the changing of any water pipe, sewer conduit or any similar structure, note and make a written report of the labor and material required for such changes. Your report is necessary for the checking of charges made for such changes.

208. Never move or tamper with any letter box. The Post Office authorities must be notified in case any of our work requires the removal or changing of any letter box, even though such change is only temporary. Disregard of this rule will lead to serious trouble.

209. Always, in any street work, keep a clear space around letter boxes, fire plugs or hydrants, fire alarm stations, patrol boxes, etc., and keep open a free passage to them.

Accidents.—210. Webster says "an accident is an event which takes place without one's foresight or expectation; an event which proceeds from an unknown cause, or is an unusual effect from a known cause, and therefore not expected."

211. Most accidents are the result of a lack of foresight. Therefore it is up to you, when performing a piece of work, to be habitual in considering what may happen as the result of the various things you do or leave undone in completing it.

212. Should it be your misfortune to meet with an accident, first see that prompt and proper attention is given to anyone injured. Call a doctor immediately, if the injury seems serious. See that the victim is properly cared for and his relatives, or people closely connected to him, are notified. Next, protect immediately from further injury any property that has been damaged.

213. Telephone to the superintendent or office immediately, advising clearly just what has occurred, and then follow carefully any instructions which may be given to you.

214. Make a complete detailed written report of everything connected with the accident, not forgetting to note the date and the precise time at which the accident occured.

215. If anyone is injured, report name and address of victim, injury, where sent and how, and name of doctor called.

216. Secure the full names and addresses of any witnesses of the accident. Report any comments such witnesses may make concerning the accident. State, as nearly as you can determine it, the cause of the accident and illustrate your explanation with a diagram, if possible.

217. You must make such a written report of every accident which may occur in your work, no matter how trivial or insignificant it may be.

218. Do not neglect a similar report of any personal injury to your self, no matter how small it may appear to you.

Main Work.—219. "A perfect piece of work is that in which the interest on the first cost, plus the annual depreciation, plus the cost of operation, is the least sum possible of attainment."—Gillette.

"Trifles constitute perfection, but perfection is not a trifle."—Michael Angelo.

220. Gas main layers cannot do better than to bear these definitions of perfect work constantly in mind, since so many men consider that low first cost only is the object most to be sought. They also fail to realize that careful, painstaking attention to the little details of their work is the only true way of producing perfect results. Because their work is buried from sight, they frequently let go at good enough, work which they would never dream of passing were it in plain sight and subject to frequent inspection.

221. Good enough in gas main and service work is the cause of more wasted dollars in gas lost, disgruntled consumers, accidents and damage to the company's good name than from all other causes added together.

222. If there is any one department of our work in which, more than any other, only the best obtainable should be accepted, it is in laying mains and services.

223. The foundation on which gas mains rest is the most important part of gas main work. A solid foundation means gas mains permanently tight, and it matters little what style of joint be used if each section of pipe be bedded solidly beyond the possibility of settlement for its entire length.

224. This means that when the trench is dug to nearly its proper depth the level and straight edge must be used to carefully grade the bottom of the trench, so that no blocking of any character whatever will be required to give the pipe its proper grade.

225. *It is imperatively necessary that each section of gas main pipe be bedded solidly for its entire length, on the solid undisturbed earth, and deep enough to be undisturbed by frost. Good main work is impossible without this.*

226. Gas mains must always be located on the same side of streets running in the same direction, and at the same distance from either the center line of the street, or the curb, or property lines, unless structures previously erected in the street prevent this arrangement.

227. You must always be sure that a permit has been secured from the city authorities before making any opening in the street.

228. Gas mains must be laid in straight lines, parallel with the center of the street.

229. If conditions make it necessary to vary the location of a gas main from its location, relative to the center line of the street, at which the main was started, or, in other words, to offset the main, that portion of the main which is not parallel to the center line of the street, must be made as short as possible without introducing sharp angles in the main.

230. As open trenches are a most prolific source of damage claims, main work must be so planned that as much as possible of a trench shall be filled on the same day it is opened.

231. Any trench remaining open at night must be properly barricaded and protected with lanterns spaced not more than 20 feet apart. It is the duty of every main or service foreman to see that this precaution is taken on every piece of work in his charge.

232. On starting a piece of main work, first line out the trench. In clay or other hard soils the trench for pipe from 4 inches to 10 inches, need only be wide enough for a man to work in with a pick and shovel.

233. In sandy soils, or soils likely to slide, the trench must be started wider, to give a batter or slope to the sides sufficient to hold them in place. If necessary, the sides of the trench must be shored or sheeted to prevent them from caving.

234. Before throwing out any earth, roll the pipes into place along the location of the trench, with the bells pointing in the direction the pipe is to lay.

235. If possible, throw the earth on the side toward the center of the street to form a barricade.

236. On macadamized or gravelled streets, or where the top soil is of a different character from that below, keep the macadam, gravel or top soil separate from the rest of the earth taken out by throwing it on one side of the trench (gutter side) and casting the earth excavated from the trench below the top, on the other side (center of street side.)

237. While we aim to have all of our street main work so carefully done that every citizen of the community will at once recognize our work from the thorough paced manner in which it is conducted, there are many people who are unobserving. You must, therefore, see that plenty of our advertising signs are prominently displayed on every piece of street work under your charge. We are proud of the spirit of progress our street work indicates and we want every citizen of the community we serve to know it.

238. On paved streets, pile the paving material in neat piles along the curb.

239. The gutters must be kept unobstructed to prevent damage in case of a storm during the progress of the work.

240. Cross streets or much used passages must always be kept open, temporary plank bridges being erected if necessary.

241. A clear space around, and an unobstructed passage to, must be maintained at each fire plug, mail box, fire alarm station, etc.

242. Before any pipe is laid at an intersecting street, the trench must be opened full depth entirely across the intersection, to ascertain that no obstruction will be met in laying the pipe at the intended grade.

243. The bottom of the trench must be given all the grade conditions will permit, at the same time keeping the low points which make drips necessary as few as possible.

244. When the grade and the flow of gas in the mains will be in the same direction, the bottom of the trench may, if necessary, be run almost level for considerable distances.

245. When the grade and the flow of gas will be in opposite directions, a grade of ½ inch in 12 feet is the least allowable.

246. After the bottom of the trench is graded, measure off the location of the bells, if cast iron pipe is to be laid, and excavate the additional depth required, before any pipe is laid.

247. In refilling trenches, the earth must be first solidly rammed into place under and at the sides of the pipe, in the same manner that railroad ties are tamped.

248. Then, if the character of the soil permits, the remainder of the earth filling may be flushed with water, to solidly refill it. If the nature of the soil, such as clay, forbids flushing, then the earth must be rammed into place in thin layers, working at least two rammers for one shoveler.

249. All of the earth thrown out must be put back in the trench, so that the street will be left in as good condition as before the main work was started, with no possibility of further settlement.

250. Pipes must not be laid in soil composed of ashes or cinders, and ashes or cinders must not be filled in around pipes. If you find such soil in your main work, immediately report the conditions to the superintendent and ask for instructions. Should an emergency require you to act without such instructions, cover the bottom of the trench with at least 1 inch of cement mortar, composed of three parts sand to one of cement, lay the pipe upon this and then cover the pipe with at least 1 inch of cement, making sure that no portion of it is exposed to the ashes or cinders.

251. It is the policy of the company that its street work be a standing monument to the community of our sense of responsibility for the work we carry on. The first cost of thorough work is greater than the expense of careless, slovenly work, but, leaving out of consideration the pride every man should have in doing his work to the best of his ability, if it earns for us the public confidence that whatever we undertake will be well done, the increased cost of doing our work thoroughly will pay us larger dividends than could be secured by any other investment.

252. Keep and forward to the superintendent promptly upon the completion of the work a record of the exact location of all services, water pipes, conduits, or any underground structure uncovered during the progress of the work. Make your measurements, giving the locations, clear by means of diagrams.

253. If any such underground structure is disturbed in any manner by our work, include in your report an explanation of what was done to it, so that in case damage claims are presented, they may be properly handled.

254. Make an immediate written report to the superintendent of any work, such as replacing pavement, curbing, cross walks, gutters, etc., which you are unable to complete, so that the necessary steps may be promptly taken to prevent any complaints from the city authorities, or from the residents along the street.

Laying the Pipes.—255. As the pipes are distributed along the side of the trench about to be dug, test each piece carefully with a hammer, for imperfections. When making such a test, the pipe should be supported near the center, with the ends free from contact with anything. A clear bell-like sound, resulting from a blow of the hammer, indicates sound pipe.

256. Lower the pipes into the trenches by means of ropes long enough so the men handling the work will not cave in the sides.

257. Just before each pipe is placed in the trench, carefully swab it out to clear it of all dust or *debris* that may be contained in it.

258. As each pipe is being lowered, the main layer in the trench must look through it, to ascertain positively that no dirt or obstruction remains in it. Too much attention cannot be given to this one point.

259. The pipe being lowered into the trench, the main layer places a twisted strand of yarn, large enough to fit tightly in the lead space of the hub, on the spigot end, enters the spigot into the bell, and, assisted by the men on the ropes, forces the spigot into the bell. The ropes are then removed, the ends of the yarn crossed over the top of the pipe, to keep the dirt out of the joint until it is made up, the pipe forced home with a bar used as a lever across the bell end of the pipe just laid, a temporary wood plug is placed in the open end of the pipe in the trench, and then the pipe is lined up with the main already laid and held into place by tamping earth around it.

260. Then excavate the additional width of trench required at the bell for making the joint, throwing the earth around the pipe and ramming it into place.

261. In sandy soils, likely to slip or cave, the space not required at the bell for making the joints can be filled as soon as the pipe is in place.

Lead Joints.—262. The calker (in extensive work one or more yarners are used for this work) then drives up the yarn placed in the joint by the main layer, and puts in additional yarn until an even space 2 inches in depth remains for the lead.

263. The yarn used must be twisted into rolls large enough to require driving into the joint.

264. Driving up the yarn must be evenly done, so the spigot will remain exactly centered in the bell.

265. The ends of the strands must be carefully lapped so that the depth of yarn will be uniform around the entire circumference of the joint.

266. As much care must be used in driving up the yarn as in calking the lead. The yarn must be compacted in the joint as tightly as is possible without forcing any of it past the spigot end. A joint properly yarned will be gas tight with only the yarn in the joint.

267. The yarn being driven up, put on the joint runner, which can be either a rubber or asbestos band, held in place with a clamp, or a ring of fire or common clay with a yarn core, to make it easy to apply or remove.

268. Whichever sort is used, the shape must be such as to leave a continuous ring of lead extending beyond the face of the bell, so that the finished joint will be flush with the face of the bell.

269. Use only new pig lead for joints.

270. Have the lead hot enough to quickly char a dry pine stick dipped into it.

271. Skim back the dross before filling the pouring pot and run the joint with but one pouring.

272. The lead must form an unbroken collar inside the bell.

273. If a joint is not properly run, the lead must be cut out and the joint run over again.

274. It is a false economy to attempt to economize on the amount of lead required for making a joint.

275. In a gas main laid on the solid, undisturbed earth below the frost line, lead joints first properly filled with lead and then carefully calked, will remain permanently tight.

276. Drive up the lead gradually and evenly, entirely around the pipe, starting next the spigot with the small calking iron and using the larger irons as the lead is driven up.

278. The lead is properly calked when with the average blow of the hammer the calking tool leaves no mark on the lead, and the large calking tool has detached the surplus lead without the use of a cold chisel, by simply compressing the lead against the inside of the bell until the surplus is sheared off.

279. When finished, a lead joint should show an even surface without tool marks, and the lead so closely driven up to the iron as to appear welded to it.

Cement Joints.—280. In making cement joints, the first requisite is an absolutely rigid pipe. Any movement or disturbance of the pipe before a cement joint is properly set will ruin the joint.

281. Before any work, therefore, is done on cement joints, enough earth must be rammed around the pipes to hold them rigidly in place.

282. The second essential is that the yarn be driven up gas tight, and that the cement set, not dry out. The yarn used must either be tarred or water soaked and the completed joint be protected to prevent the evaporation of the water in the cement until the cement has set.

283. The cement must be mixed fresh for each joint with 1 volume of water to 3 to 4 volumes of cement. The temperature when the work is done will govern the amount of water required, the higher the temperature the more water being necessary. The cement must be mixed as stiff as is possible to work it. An excess of water is better than an insufficiency, but it is important to carefully gauge the quantity so that just enough is used.

284. First yarn the joint as if for a lead joint, driving up the yarn evenly as hard as is possible without forcing any of it into the pipe past the spigot end. This is the most important part of the work of making a cement joint. The tightness of the joint depends on the yarn. The cement also holds the yarn in place.

285. Then nearly fill the joint with cement, carefully working it in with the tool all around the pipe.

286. Next drive in a strand of twisted yarn, large enough to make it require driving with the yarning tool and hammer to force the yarn into the joint.

287. Drive up this yarn evenly all around the joint, using as much care to drive it home as if you were making a lead joint. The more the cement can be compacted the better will the finished joint be. The success of the cement joint depends upon the care with which the yarn is driven home.

288. Finish the joint by packing the remaining space with cement and pointing up the whole with the trowel.

289. In warm weather the completed joint must be covered over with wetted burlap, and the burlap frequently sprinkled with water until the cement has set.

290. Cement joints must not be subjected to pressure until they have set at least 24 hours—48 hours is better.

Wrought Iron Pipe.—291. Prepare the trench with the same care as for cast iron pipe, except no extra depth is required at joints.

292. Remove the couplings from the ends of the pipes on which they were screwed at the factory, reverse the couplings, carefully clean the threads on the couplings and pipe and screw the coupling on the opposite end of the pipe. The object gained by this is, that should the threads exposed in shipment be damaged, the extra force required to make them up properly can be more easily applied when screwing up the couplings separately than when a whole length of pipe must be handled. It is also more difficult to make up two lengths of pipe than it is to screw a coupling on one pipe. Reversing the couplings leaves clean, bright threads to be made up when the pipes are coupled and enables the work to be done easier.

293. Threaded joints must be made up until but one or two threads of a standard length thread are exposed. The joint will be the stronger if the threads are screwed up to the shoulder.

294. If a joint is making up tight before the threads are screwed together far enough, a few raps of a hammer upon the couplings while pressure is applied on the tongs, will make the work easier.

295. Wrought iron pipe can best be made up on cross pieces stretched over the trench. After several lengths are made up, the cross pieces are removed and the pipe lowered into place, care being exercised to keep *debris* from falling into the trench until the pipe is bedded solidly on the bottom.

296. In starting a screw joint with a 4-inch pipe or larger, time can be saved by taking several wraps around the pipe, windlass-like, with a rope, after the thread is started, and then making up the first part of the joint by pulling on one end of the rope until the tongs are made necessary.

297. The chief value of a pipe joint cement is as a lubricant, to overcome the friction when a joint is made up. Whichever kind is used should be sparingly applied on the threads of couplings, fittings, etc., to avoid dangerous accumulations inside the pipe.

298. In cutting wrought iron pipe, always remove the burr left inside the dipe by the tool.

299. After the joints in wrought iron pipe have been made up, the tool marks must be carefully painted over.

300. A thick coating of tar or other protecting compound must be applied to the pipe after it is lowered into the trench.

Setting Specials.—301. Specials and drips must always rest solidly on the undisturbed earth. Permanently tight mains are impossible if they do not.

302. Should you be careless enough to excavate too deeply for a special or drip, the filling must be cement concrete. No blocking of any kind may be used.

303. When specials for future connections are set on feeder mains, or mains which it will be difficult to bag off when it is desired to make connections, always lay a short piece of pipe from the opening in the special. Then when the connection is to be made, it will only be necessary to bag off the short pipe.

304. All openings in specials set for future connections must be closed with cast iron plugs with permanent joints.

305. All openings of any description put in mains for any purpose must always be kept securely closed when no work is being done requiring them to be open.

306. When it is necessary to reduce the size of mains, proper reducing specials must be used.

307. When conditions require the use of a sleeve, the ends of the pipes to be joined must first be carefully covered with a collar of sheet iron, sheet lead, tin, pasteboard or canvas. If sheet iron is used, it must fit closely to the pipes and the ends of the iron or tin must be carefully lapped. Any interstices between the pipe and whatever material is used for a collar must be filled with putty, red lead, cement or fireclay, so that the sleeve may be run full of lead. In fitting the sleeve, it must be centered on the pipes, so that each end is inserted an equal distance and the lead space is uniform around the entire circumference of the pipe.

308. Whenever it is necessary to use packing, as in fitting a saddle flange, only pure sheet rubber or sheet lead may be used, and the pipe and fittings must be carefully cleaned from dirt and oil.

Drips.—309. On important feeder mains and on mains where a long stretch of pipe is to be dripped, only line drip pots may be used.

310. On small mains where only a short stretch of pipe is drained and very little condensation is likely to result, drips made of pipe are allowable. A pipe drip for a 4 inch main should be made as follows: Tap the bottom of the main 1¼ inches. Connect a 2-inch by 1¼-inch tee to the opening with a short shoulder nipple. Plug one side of this tee and run a 2 inch pipe from the other side to the point where the drip riser or stem is to set, pitching the pipe sharply away from the main. Screw a 2-inch tee, bullheaded, on the end, letting the run of the tee stand vertically. From the bottom of the tee run a leg of 2 inch pipe, at least 15 inches long, and as much longer as practicable, with a 2-inch cap closing the lower end. Into the top of the tee screw a 2-inch by 1-inch bushing from the underside of which a 1-inch pipe, long enough to extend within 4 inches of the bottom of the 2-inch leg has been screwed. The 1-inch pipe must project through the bushing at least 1 inch. Connect the drip stem to the 1-inch pipe extending through the bushing with a coupling, first wrapping several turns of lamp wicking soaked in red lead, around the 1-inch pipe on top of the bushing and then screw the coupling tight down on the wicking.

311. No piping smaller than 1 inch may be used on drips, either for stems or for any other purpose.

312. On drip pots the cover should be tapped for 2-inch pipe and the cover should be made up with a lead joint calked like a main joint. Make up a 1-inch pipe long enough to reach within 4 inches of the bottom of the drip pot, through a 2-inch by 1-inch bushing, as directed for a pipe drip. Screw the bushing into the 2-inch opening in the drip pot cover. Run the drip stem with 1-inch pipe, as for a pipe drip, except that when the stem cannot be set directly over the drip pot, which seldom occurs, the horizontal pipe must be graded sharply to drip into the pot.

313. All piping set for drips must rest solidly upon the undisturbed earth.

314. Drip stems must be located at a uniform distance from the curb line and a short 1-inch nipple should be screwed on the top end, so that when the thread becomes worn from pumping the drip, only the nipple need be renewed.

315. Drip stems must not project enough above the surface of the ground to cause pedestrians to trip over them.

316. Always report the installation of a drip separately, recording the character of the drip, its diameter and depth below the bottom of the main in which it is set, if it is a pot drip; the length, size of pipe and fittings used, if a pipe drip; a list of pipe and fittings in the drip stem, and the exact location, illustrated by diagrams of the drip pot, or tap in the bottom of the main, if a pipe drip, and the drip stem. Also give the number of the house nearest to the location of the drip stem.

317. All piping for drips must be run before the main trench is filled in.

(To be Continued.)

Correspondence

[The JOURNAL is not responsible for the opinions expressed by correspondents.]

Mr. Spang Replies to Mr. Knudson.

NEW YORK, May 26, 1906.

To the Editors AMERICAN GAS LIGHT JOURNAL: In reply to Mr. A. A. Knudson, in your issue of 14th inst., I will state that he has made a number of electrolytic surveys, but notwithstanding such experience, he has not offered any suggestion to make the single overhead trolley system absolutely harmless from electrolytic effects. He has invariably maintained that the double trolley system is the only remedy for electrolysis.

It is true that he has furnished me with copies of his electrolysis reports. In fact, I have secured a copy of nearly every electrolytic survey and report made in this country, for the purpose of fully confirming the stand I have taken upon the electrolysis problem during the past 12 years.

Mr. Knudson is apparently imbued with the idea that no one can be regarded as an electrolysis expert unless he makes electrolytic surveys. Such surveys or electrical measurements can be made by almost any electrician, but it requires a thorough expert to properly interpret them.

My experience with track rail circuits began in 1872, long before electric traction was developed. I experimented with the track rails as electric conductors during three years and thereby secured a proper knowledge

of the grounding action of electricity with rail circuits and also of the effects of lightning discharges upon the automatic block signalling relays with such circuits. I devised the first practical rail bond and a number of the automatic block signalling features now employed upon steam railroads. During 1875 I patented a method of employing the alternating current for block signalling purposes, so as to safeguard against a safety signal being given by induced electric charges during a thunderstorm, also by earth currents attending excessive solar activity and the aurora borealis. It is the basis of the alternating current system of selective signalling employed on some electric railways and upon which, I am recently informed, there were over 30 cases of interference pending in the Patent Office.

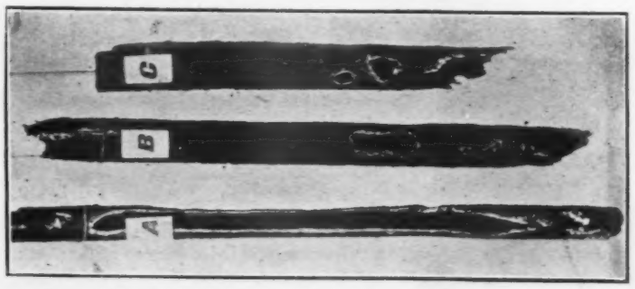
I will add that I filed in the Patent Office, long before electrolytic surveys were made, an application covering the proper method for preventing electrolysis in connection with the single overhead trolley system, which is forthcoming, together with the simplest method of automatic signaling and lightning protection. Efficient, safe and simple electric traction requires a practical experience not possessed by any one of the individuals who are now posing as electrolysis experts. The unsatisfactory state of the electrolysis art was clearly set forth by Judge O. B. Brown, of the Court of Common Pleas, of Montgomery county, O., in connection with the suit of the City of Dayton *vs.* The City Railroad. Four electrolysis experts were engaged in this case and several college professors and instructors of electric engineering and other experts testified. In commenting upon the expert evidence Judge Brown said:

"The testimony in this case shows that the plaintiff is powerless to adopt any method whatever to protect its piping system. On the other hand, a single trolley street railroad, such as the defendant operates, can adopt no method by which the tendency of the current to flow through the earth and on to the pipes can be entirely overcome."

I infer from the electrolytic survey made of Dayton, O., in 1898 by Harold P. Brown, that the grounding action of the trolley current was in connection with the saturated earth of the Miami River and the intervening water pipes and that the electric destruction could have easily been prevented without resorting to the drainage system or insulating joints in the water pipes as was suggested during the trial. It is obvious that the electrolysis problem will never be solved by such litigation.

I deem it advisable to call attention to the destructive effects of the current of the Manhattan Elevated Railway system, for the reason that in this case the conductivity of the metallic return is much greater than that of the third rail or outgoing conductor, and consists of the well bonded elevated railroad structure in connection with the well bonded track rails.

In the photograph is shown 3 of 6 adjacent destroyed service gas



pipes after being subjected to the electric current for about 18 months, flowing in connection with the iron ducts and lead sheaths of adjacent Edison electric light cables, which are adjacent to the return electric railway ducts and cables leading to the Manhattan sub-power station on Spring street near Thompson. *A* is an inch pipe formerly connected with a street lamp and was adjacent to an Edison coupling box. *B* and *C* are 1¼-inch pipes which supplied 436 and 438 West Broadway.

I have been informed that from 1,200 to 1,800 amperes of current (according to the minimum and maximum output) flows over a bond wire cable between the lead sheaths of underground telephone cables and the elevated railroad structure at Spring street and West Broadway, near said sub-power station.

It would, no doubt, interest your readers if Mr. Knudson will explain how the law of divided circuits applies in this case, bearing in mind that the metallic return for the power current has a greater conductivity than is actually necessary for such current return.

H. W. Spang.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

Mr. J. W. Roney, who has been the local Manager of the Richmond Light, Heat and Power Company, at Richmond, Ind., for a number of years, died Friday, June 1st. He gave the Company his continuous service since 1891 up to the time of his demise. The United Gas and Electric Company, operating this plant, will greatly feel the loss of this employee as well as those who knew him fraternally.

Mr. William F. Codd has resigned as Treasurer and General Manager of the Gas and Electric Company, of Nantucket, Mass. The vacancy has been filled by Mr. Franklin Folger, Treasurer, and John C. Ring, General Manager. The Company has secured a new office at the corner of Main and Orange streets.

The Laclede Gas Light Company, of St. Louis, Mo., has declared the usual semi-annual dividend of 2½ per cent. on its preferred stock and the regular quarterly dividend of 1¼ per cent. on its common stock, both payable June 15th.

A newspaper reporter under the head of a new disease from gas, published a sensational article on *gastritis*. This is almost as bad as the *carbonated* water gas mentioned in last week's issue.

The petition of the Birmingham Railway, Light and Power Company for a franchise to install a gas plant at Ensley, Ala., was reported upon favorably and after minor amendments was adopted. The franchise grants the Company 30 years' rights to lay gas mains, services, holders and other apparatus necessary to supply gas at a price to be fixed.

The Atlanta Gas Light Company, of Atlanta, Ga., is being investigated with respect to its franchise by special committee of Aldermen, which committee is not agreed within itself as to the report to be made. There is a suggestion that the Company pay the city for the use of its streets, and municipal ownership is also in the air. Five of the committee voted for this latter project. This committee should post itself upon the results of municipally owned gas plants in America. We feel sure then that the present Company's service would not be criticized.

The Scranton (Pa.) Gas and Water Company has leased its gas plant to the Hyde Park Gas Company, with a provision in the lease that the latter Company can purchase the plant if it sees fit. As Mr. W. W. Scranton owns 90 per cent. of the Gas and Water Company and 96 per cent. of the Hyde Park Gas Company, it looks like taking money from one pocket and putting it into the other.

The State Commission of Gas and Electricity gave a hearing at its New York office on May 25th on a complaint of the Town Board of Nyack, N. Y., against the Nyack Gas Light and Fuel Company, relative to the price of gas and electricity and the quality and price of gas furnished in that town. Reports are not yet in.

A man by the name of August Keller, of Pittsburgh, tripped over a small gas pipe protruding from the ground and broke his arm, and is suing the city for $4,000 damages. It is not an uncommon sight to see gas service boxes and drip pipes projecting above grade in some towns. Damage cases are more expensive than keeping this property of the gas company below the surface.

The Peoria (Ills.) Gas and Electric Company has filed a score of petitions asking permission to be allowed to lay gas mains and string wires on the streets without success. As it is only a question of time when this outlying district will be within the corporate limits of Peoria, the franchise granted should be in accord with the franchise under which the Company now operates in the city proper, and this will probably be the final outcome of its petitions.

Mayor Archambault, of Woonsocket, R. I., expects to be successful in a petition to the Woonsocket Gas Company, in getting the price of gas reduced. President Andrews, of the Board of Alderman, has appointed a special committee to investigate the gas conditions of that city.

It is reported that the Edison Electric Company, of Brockton, Mass., is making an effort to purchase the Stoughton Gas and Electric Company.

THE Haverhill (Mass.) Gas Company is laying about 10 miles of pipe and it is thought that with additional output from the old and new mains that it will be necessary to make extensive works improvements.

EAST POINT, Hapeville, College Park and Oakland City, Ga., will erect their own water works and gas plant if the Atlanta Companies do not furnish service within a reasonable period. They propose spending $50,000 on the water plant and an equal sum for gas.

BOTH branches of the City Council of Pawtucket, R. I., passed a resolution authorizing the joint committee on street lights to make a contract with the Pawtucket Gas Company, whereby the Company receives a 15-year exclusive franchise, and in return the price of gas is reduced to $1.10 per 1,000 cubic feet, beginning July 1st, next. The price will remain at that figure for 5 years at a reduction of 5 cents per 1,000 and at the end of the second 5-year period the price is to be $1 net. The contract also provides for the payment to the city of 2 per cent. of the income of the Company and the quality of the gas to serve the citizens is also safeguarded. We predicted a year ago that Captain McGregor would get this matter settled to the mutual satisfaction of the Company and the city.

THE gas works of Stockbridge, Mich., operated by the Stockbridge Gas and Fuel Company, have recently passed under the control of the Federal Gas Corporation, of Chicago. The new management will install a water gas apparatus at once.

ST. CLOUD, MINN., will install a holder this year.

THE Newport News (Va.) Board of Aldermen introduced an ordinance providing for the appointment of a committee to investigate the advisability of issuing city bonds for the establishment of a gas plant.

VICE-CHANCELLOR BERGEN made an order at Trenton, N. J., requiring the Public Service Corporation to show cause in the Court of Chancery why it should not be enjoined from laying gas pipes in the Trenton and New Brunswick turnpike, as it is claimed that they have never obtained permission to do so. It is also argued that the pressure of gas in the mains will be so high as to make it impracticable and dangerous to tap them for service along the lines. The Jerseyites do not seem to become familiar with the modern methods of handling high pressure gas for domestic consumption.

FRANK V. CULBERTSON and George W. Beers, of Fort Wayne, Ind., are seeking a franchise at Kendallville, Ind., for the supplying of manufactured gas. They were successful in obtaining the franchise at Auburn, Ind., for the Wayne General Construction Company.

THE Business Men's Committee, of Danbury, Conn., is making strenuous efforts to obtain cheaper gas, and is comparing gas in Boston with gas in Danbury. We did not know that they were in the same class!

WATERTOWN, S. D., is building a gas plant.

AN increase in the capital stock of the United Gas Improvement Company, of Philadelphia, from $36,725,000 to $45,900,000 has been authorized, and stockholders may subscribe at par $50, to the extent of 25 per cent. of their holdings.

COUNCILMAN CLARK, of North Adams, Mass., who is thoroughly posted on municipal ownership affairs, spoke before the Good Government Club in Williamstown, Mass., a short time ago. He not only showed that municipal ownership is no better than private ownership, but illustrated his remarks with concrete instances in this country and abroad of its failure. It is interesting to know that one-half of the total British debt is a debt of the municipalities.

THE Western (N. Y.) Construction Company has been organized for the construction of railways, gas and electric light and power transmission properties.

THE town of Framingham, Mass., is debating with itself as to the advisability of purchasing the Framingham Gas, Fuel and Power Company and the Edison Electric Illuminating Company. We advise them to get no further than debate.

RICHMOND, VA., municipal plant requires rehabilitation. Like other municipal plants it has not been kept up to date. They are now advertising for a gas engineer to advise them what to do and to prepare plans and specifications for such work.

IN the Platform of the United Political Action by Organized Labor Association the following plank is found: "Restoration to cities and towns of their rights which legislative action has taken from them by the corrupt influence of railroad and railway, gas and electric light corporations" and "Public ownership of those utilities which in their nature are monopolies."

SOME Michigan men are seeking a franchise at Macon, Ga., to sell gas at $1.25 per 1,000 and also to split the profits with the city. Macon must want to increase the city debt.

CONTEMPLATING the removal of the gas works of the Laclede Company at St. Louis, Mo., Vice-President Cowdery, says: Our plan is to divert the tortuous course of the River Des Peres from Broadway to the Mississippi and excavate a channel 2,000 feet long, 280 feet wide at the surface and 60 feet deep, making a section of canal of greater proportions than the Panama ditch, for the purpose of receiving the coal towed from Pittsburg and unloaded with an automatic digger and conveyor into our plants on the banks of the river. We will provide a storage capacity of coal for 1,000,000 tons and erect 4 gasholders of 8,000,000 cubic feet each capacity, although we have now 12,000,000 cubic feet holder capacity. The new coal gas plant will have a capacity of 40,000,000 feet per day. The water gas plant also 40,000,000 per day. Work will commence as soon as the city gives the order for vacating the streets. It is plainly to be seen that brother Cowdery is planning for 1,000,000 people in St. Louis in the near future.

SUPREME COURT JUSTICE JOSEPH A. BURR has appointed lawyer Joseph Morschauser, Referee, to sell the property of the Fishkill and Matteawan Gas Company at Fishkill, N. Y., to satisfy a judgment of $93,000, obtained by the Knickerbocker Trust Company, of New York city. The sale takes place on the 29th of June at the Poughkeepsie Court House, at noon.

THE Washington, D. C., District Committee has presented a measure to compel the Washington Gas Light Company and the various utility companies to pay an additional tax of 12 per cent. of the net earnings of the companies.

MESSRS. HYDE & DUNN are seeking a franchise in Abilene, Kas., to supply gas to the citizens thereof.

THE Consumers Gas Company's building on Toronto street, at Toronto, Ont., suffered from slight explosion. The damage did not exceed $500.

IT is said that if the Great Barrington Electric Light Company, of Great Barrington, Mass., which owns a franchise to supply gas, does not purvey that article in the near future, that a Company will be formed to obtain a franchise for that purpose.

MR. V. J. DUNCAN is still pursuing the subject of obtaining a franchise for the distribution of gas in Marseilles, Ills. It is thought that he will be successful at an early date.

THE Y. M. C. A. classes in Birmingham, Ala., are including visits to gas plants as part of their education.

THE Carlisle (Pa.) Borough Council has decided to dispose of the stock of the Carlisle Gas and Water Company, which it owned since the organization of the Company. The holdings amount to $44,000.

ALGIERS, LA., is again supplied with gas after being cut off from its supply from New Orleans by a break in the main across the river. It required but 60 days for Manager Miller to erect a new plant.

THE stock of the Bethlehem Consolidated Gas Company has been transferred to the Associated Gas and Electric Company, of Ithaca, N. Y. It is expected that some improvements will be made at the plant at an early date.

AN important contribution to the timely question of municipal ownership appears in the May number of the *Journal of Political Economy*. Its author is Everett W. Burdett, of the Boston Bar, who with a competent statistician as assistant, spent much time abroad last summer making a painstaking investigation of the situation at first hand. Every gas man should get this number and familiarize himself with the facts given therein.

THE AMERICAN GAS LIGHT JOURNAL

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PROPRIETORS.

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NOTIFICATION RESPECTING ADVERTISING.

Orders for new advertising, or for changes in standing advertisements, to insure attention in the issue following their reception, must be in hand any time of Wednesday.

AGENTS:

New York—American News Co., 39 and 41 Chambers St.
Germany—Lemcke & Buechner, of New York.
England—Aug. Siegel, 30 Lime Street, London.

MONDAY, JUNE 11, 1906.

The Market for Gas Securities.

Judge Lacombe has handed down his decision continuing the restraining order prohibiting the State and city officials from enforcing the 80-cent gas law in New York city. Judge Lacombe, in his decision, questions the constitutionality of the 80-cent gas law, and also intimated that the company should have been allowed the valuation of its franchise which the gas commission excluded in its consideration of the 80-cent gas bill. This injunction will remain in force pending a settlement of the litigation in the U. S. Supreme Court. Previous to this decision Consolidated gas sold up from 139 to 147½. The protective pool of $5,000,000 formed about a year ago in Massachusetts gas was dissolved to-day. There never was any occasion for its acting.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

16 WALL STREET, NEW YORK CITY.

JUNE 11.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share.

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked.*
Consolidated	$73,177,000	100	144	144½
Central Union, Bonds, 5's	3,000,000	1,000	101	104
Equitable Bonds, 6's	1,000,000	1,000	..	105
" 1st Con. 5's	2,300,000	1 000	118	120
Mutual	3,500,000	100	225	250
Municipal Bonds	750,000	..	..	..
New Amsterdam Gas Co.. Bonds, 5's	11,000,000	1,000	100	102
New York & Richmond Gas Co. (Staten Island)	1,500,000	100	37	43
1st Mtg. Gold Bds. 5 p. ct.	1,000,000	..	98	104
Northern Union, Bonds, 5's	1,250,000	1,000	101	103
New York and East River Bonds 1st 5's	3,500,000	1,000	108	111
" 1st Con. 5's	1,500,000	..	104	110
Standard	5,000,000	100	140	160
Preferred	5,000,000	100	155	175
Bonds, 1st Mortgage, 5's	1,500,000	1,000	111	114
Yonkers	299,650	500	130	..
Out-of-Town Companies.				
Brooklyn Union	15,000,000	100	125	135
" " Bonds (5's)	15 000,000	1,000	108	112
Bay State	50,000,000	50	5/16	¾
" Income Bonds	2,000,000	1,000	..	75
Binghamton Gas Works	450,000	100	..	65
" 1st Mtg. 5's	509,000	1,000	95	100
Boston United Gas Co.— 1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000.000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	9	10
" " Bonds, 5's	5,250,000	1,000	75	80
Capital, Sacramento	500,000	50	..	35
Bonds (6's)	150,000	1,000	..	..
Chicago Gas Co. Guaranteed Gold Bonds	7,650,000	1,000	104	106¾
Cincinnati Gas and Electric Co.	29,500,000	100	103½	103¾
Columbus (O.) Gas Co., 1st Mortgage Bonds	1,500,000	1,000	90	..
Columbus (O.) Gas Lt. & Heating Co	1,682,750	100	..	95
Preferred	3,026,500	100	107¼	108
Consumers, Toronto	,000,000	50	200	204
Consolidated, Baltimore	11,000,000	100	83	83½
Mortgage, 6's	3,600,000	..	..	118
Chesapeake, 1st 6's	1,000,000	..	..	..
Equitable, 1st 6's	910,000	..	..	..
Consolidated, 1st 5's	1,490 000	..	..	112
Consolidated Gas Co. of N. J.	1,000,000	100	15	17
" Con. Mtg. 5's	880,000	1,000	92	95
Bonds	75,000	..	..	100
Detroit City Gas Co.	5,000,000	50	..	50
" Prior Lien 5's	4,618,000	1,000	..	98
Detroit Gas Co., 5's	381,000	1,000	75	80
" Inc. 5's	16,000	100	98½	100
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	..	101
Essex and Hudson Gas Co.	6,500,000	..	39	40
Fort Wayne	2,000,000	..	..	..
" Bonds	2,000,000	..	55	..
Grand Rapids Gas Lt. Co. 1st Mtg 5's	1,225,000	1,000	104½	105
Hartford	750,000	25	190	200
Hudson County Gas Co., of New Jersey	10,500,000	..	110	112
" Bonds, 5's	10,500,000	..	107¼	108½
Indianapolis	2,000,000	..	60	70
" Bonds, 5's	2,650,000	..	104½	105
Jackson Gas Co	250,000	50	82	..
" 1st Mtg. 5's	290,000	1,000	97	100
Kansas City Gas Light Co., of Missouri	5,000,000	100	..	36
Bonds, 1st 5's	3,822,000	1,000	102	104
Laclede, St. Louis	10,000,000	100		105
Preferred	2,500,000	100	95	110
Bonds	10,000,000	1,000	104	104¼
Lafayette Gas Co., Ind.	1,000,000	100	..	60
Bonds	1,000,000	1,000	60	65
Louisville	2,570,000	50	143	145
Madison Gas & Elec. Co. " 1st Mtg. 6's	350,000	1,000	106	108¾
" 6 per cent. scrip, due 1910	100,000	25	85	87
Montreal, Canada	2,000,000	100	218	218¾
Nashville Gas Lt. Co.	1,000,000	100	110	..
Newark, N. J., Con. Gas Co.	6,000,000	..	56	58
Bonds, 6's	6,000,000	..	137	138
New Haven	2,000,000	25	500	..
Peoples G. L. & Coke Co., of Chicago	25,000,000	100	92½	93½
Peoples Gas Lt. & Coke Co., Chicago, 1st Mortgage	20,100,000	1,000	..	..
2d "	2,500,000	1,000	104	..
Rochester Gas & Elec. Co.	2,150,000	50	88	..
Preferred	2,150,000	50	118	..
Consolidated 5's	2,000,000	..	104½	105¼
San Francisco, Cal.	15,800,000	100	.	..
St. Joseph Gas Co. " 1st Mtg. 5's	751,000	1,000	92	..
St. Paul Gas Light Co	1,500,000	100	45	47
1st Mortgage 6's	650,000	1,000	113	116
Extension, 6's	600,000	1,000	113½	115
General Mortgage, 5's	2,465,000	1,000	96¾	..
Syracuse, N. Y.	1,975,000	100	50	55
Bonds	2,047 000	1,000	102	..
Washington, D. C	2,500,000	20	300½	301
First mortgage 6's	600,000	..	..	..
Western, Milwaukee	4,000,000	..	..	..
Wilmington, Del	600,000	50	230	..

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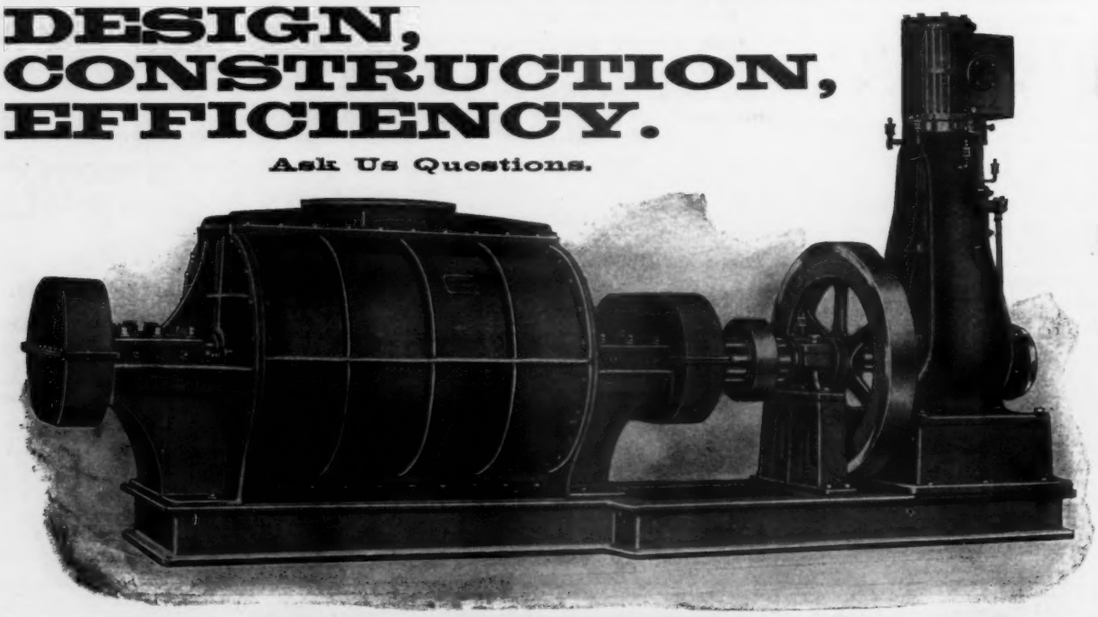

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DEAR SIRS:

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Yours faithfully, _____

DEAR SIRS:

In reply to your enquiry of the 27th March *re* Rotary Meter, I have not the slightest hesitation in stating that the meter we have in use here is giving every satisfaction.

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It is fixed underground, and since we have had it, *viz.*, 3 years, we have only taken it out once for examination (and this out of curiosity); as you will quite understand, there is a lot of oil, tar, etc., in contact with the meter at this point, and we thought it might be getting clogged up, but were pleased to find that such was not the case.

From our experience we have not the slightest hesitation in recommending its adoption to all gas makers.

I shall be pleased to reply further if necessary.

Yours very faithfully, _____

GENTLEMEN:

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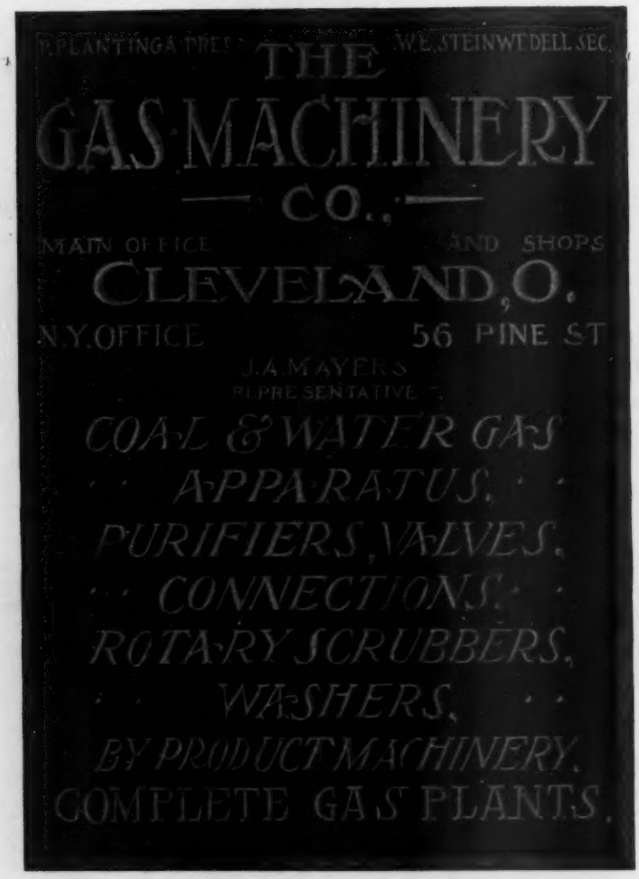

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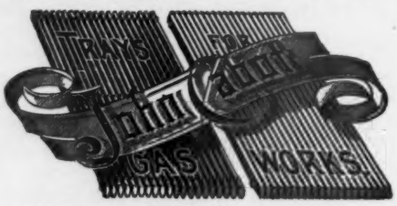

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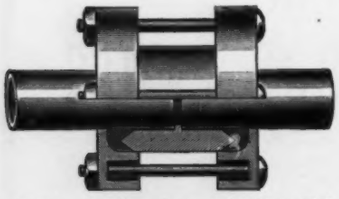
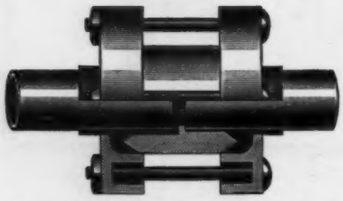
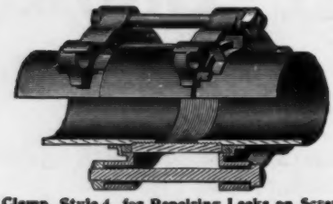

Regular Coupling, Style 1, for Plain End Wrought Iron Pipe.


Insulating Coupling, Style 5, for Plain End Wrought Iron Pipe.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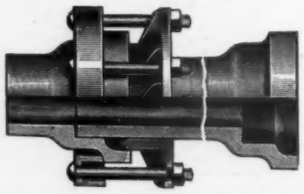
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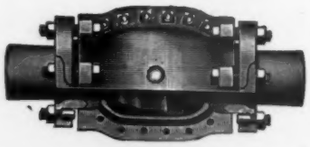
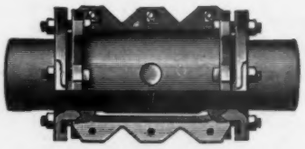
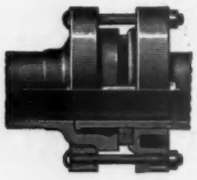

Split Sleeve for Repairing Broken Bell on Cast Iron Pipe.


Split Sleeve for Repairing Broken or Cracked Cast Iron Pipe.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" 8	23.50	1 "	2¾	28½ "	10¾ "	48 "
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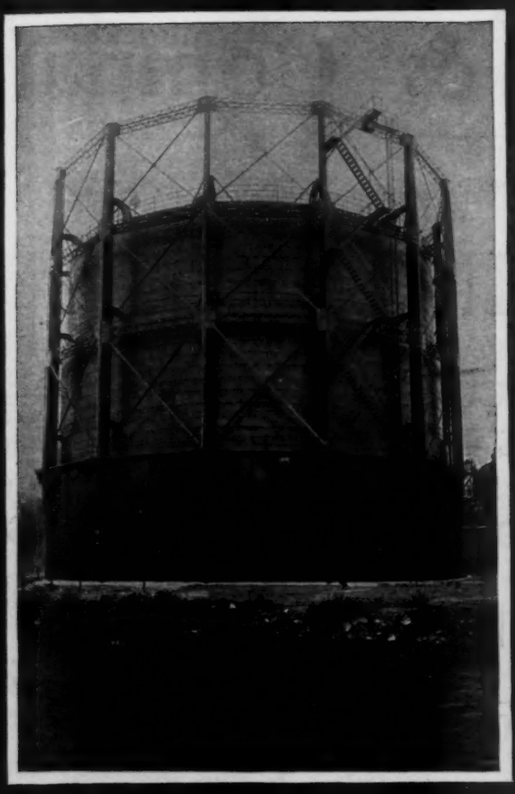

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Where
d = diameter of pipe in inches,
p_1 = absolute initial pressure in pounds per square inch,
p_2 = absolute terminal pressure in pounds per square inch,
L = length of pipe in miles,
w = specific gravity of the fluid when air = 1.

To Find the Discharge from a Pipe and the Required Size of Pipe.

(1.) Set the specific gravity of the fluid opposite the length of pipe;

(2.) Bring the DIFFERENCE of the initial and terminal gauge pressures opposite the SUM of the initial and terminal gauge pressures;

(3.) Opposite any diameter of pipe will now be found the discharge in cubic feet per hour at atmospheric pressure; and

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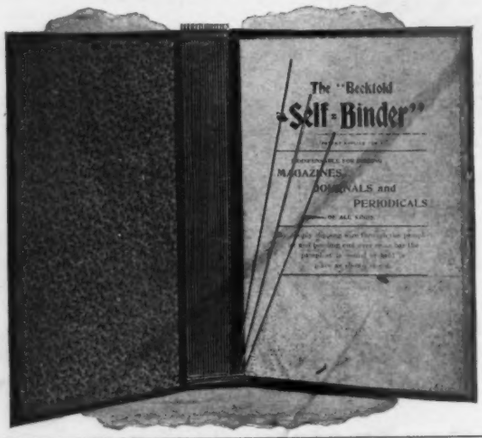

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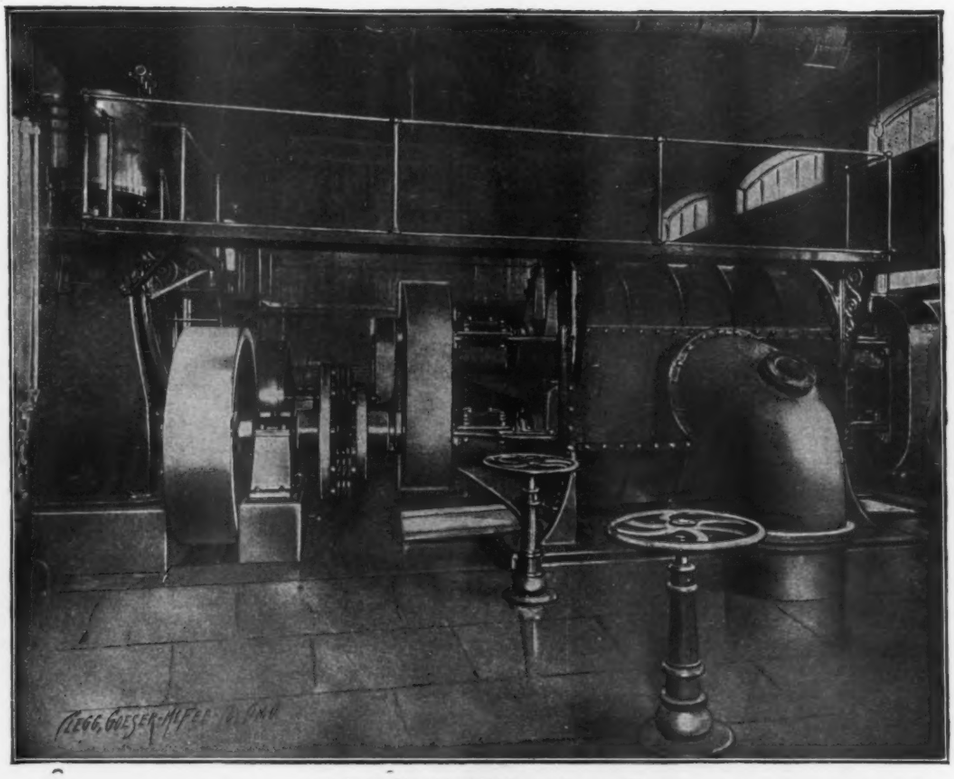

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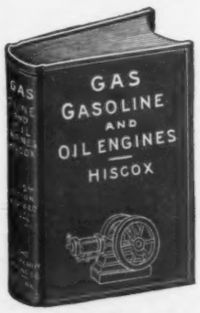

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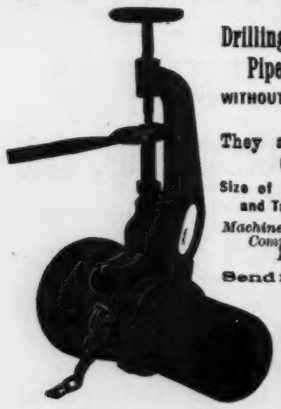

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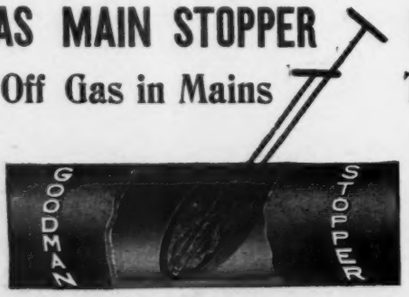

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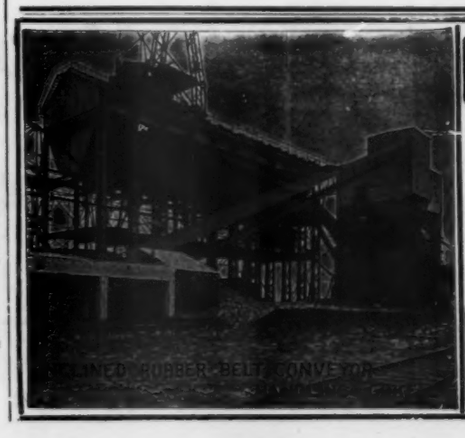

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Photometrical and Experimental Apparatus.

PUBLIC LIGHTING TABLE.

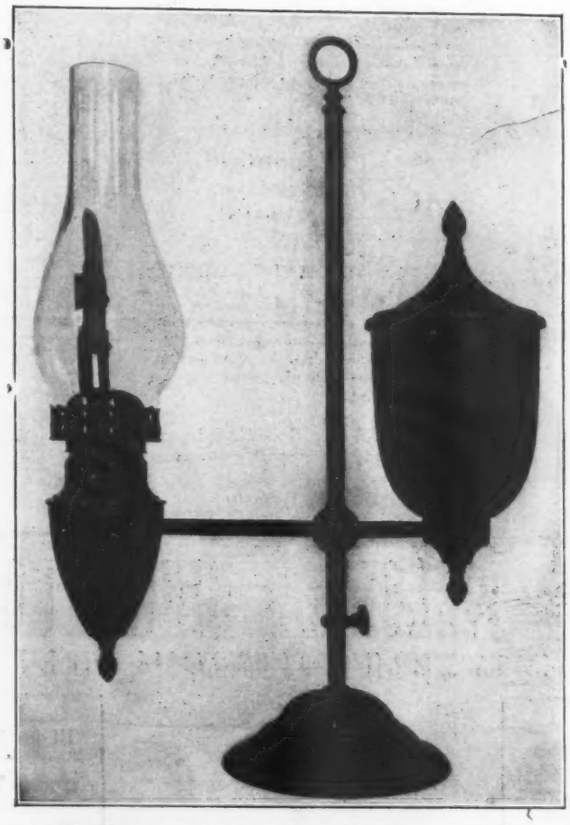
JUNE, 1906.

Day of Week.	Table No. 1. FOLLOWING THE MOON. Date.	Light.	Extinguish.
Fri.	1	12.50 AM	3.30 AM
Sat.	2	1.30	3.30
Sun.	3	2.10	3.30
Mon.	4	2.50	3.30
Tue.	5	No L.	No L.
Wed.	6	No L.FM	No L.
Thu.	7	No L.	No L.
Fri.	8	8.00 PM	10.20 PM
Sat.	9	8.00	11.20
Sun	10	8.00	12.00
Mon.	11	8.00	12.40 AM
Tue.	12	8.00	1.10
Wed.	13	8.00 LQ	1.40
Thu.	14	8.00	2.10
Fri.	15	8.00	2.40
Sat.	16	8.00	3.10
Sun.	17	8.00	3.30
Mon.	18	8.00	3.30
Tue.	19	8.00	3.30
Wed.	20	8.00	3.30
Thu.	21	8.00 NM	3.30
Fri.	22	8.00	3.30
Sat.	23	8.00	3.30
Sun.	24	8.00	3.30
Mon.	25	8.00	3.30
Tue.	26	9.50	3.30
Wed.	27	10.20	3.30
Thu.	28	11.00	3.30
Fri.	29	11.30 FQ	3.30
Sat.	30	12.00	3.30

TOTAL HOURS DURING 1906.

By Table No. 1.

	Hrs.Min.
January	223.40
February	190.40
March	192.10
April	167.00
May	152.20
June	142.10
July	150.20
August	157.40
September	170.00
October	185.10
November	201.40
December	214.00
Total, yr.	2146.50



THE ELLIOTT KEROSENE STANDARD PHOTOMETER LAMP.

***

10-Candle Power.

***

This lamp is a perfect substitute for the 10-candle Pentane Lamp hitherto used, and has the following advantages:

1st. It uses Standard Kerosene Oil (Pratt's Astral Oil or equivalent).

2d. It is remarkably steady. Will burn 24 hours continuously with less than 2 per cent. variation.

3d. It is much less dangerous than Pentane, which is a kind of gasolene.

4th It is not easily affected by air currents in the photometer room.

5th. Since the lamp may burn continuously, the candle power of gas may be taken at any moment, if necessary. This insures steady illuminating power without waste of carburetting material.

6th. The first cost of the lamp brings it within the reach of even small gas works.

7th. Costs much less to maintain than a Pentane lamp or sperm candles doing the same service.

8th. Is not affected by the weather.

PUBLIC LIGHTING TABLE.

JUNE, 1906.

Day of Week.	Table No. 2. NEW YORK CITY. ALL NIGHT LIGHTING. Date.	Light.	Extinguish.
		P. M.	A. M.
Fri.	1	7.15	3.15
Sat.	2	7.15	3.15
Sun.	3	7.15	3.15
Mon.	4	7.25	3.15
Tue.	5	7.25	3.15
Wed.	6	7.25	3.15
Thu.	7	7.25	3.15
Fri.	8	7.25	3.15
Sat.	9	7.25	3.15
Sun.	10	7.25	3.15
Mon.	11	7.25	3.15
Tue.	12	7.25	3.15
Wed.	13	7.25	3.15
Thu.	14	7.25	3.15
Fri.	15	7.25	3.15
Sat.	16	7.25	3.15
Sun.	17	7.25	3.15
Mon.	18	7.30	3.15
Tue.	19	7.30	3.15
Wed.	20	7.30	3.15
Thu.	21	7.30	3.15
Fri.	22	7.30	3.15
Sat.	23	7.30	3.15
Sun.	24	7.30	3.15
Mon.	25	7.30	3.15
Tue.	26	7.30	3.15
Wed.	27	7.30	3.15
Thu.	28	7.30	3.15
Fri.	29	7.30	3.15
Sat.	30	7.30	3.15

TOTAL HOURS DURING 1906.

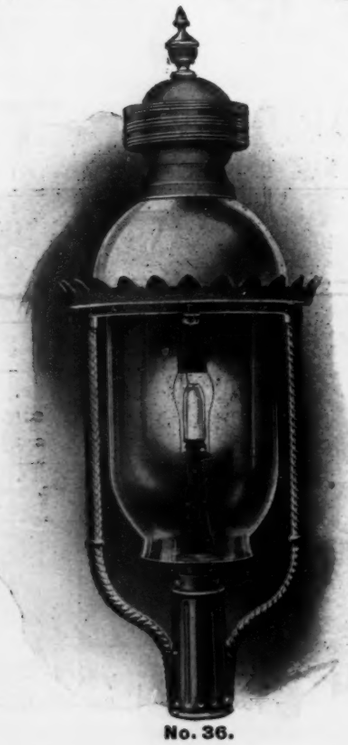
By Table No. 2.

	Hrs.Min.
January	423.20
February	355.25
March	355.35
April	298.50
May	264.50
June	234.25
July	243.45
August	280.25
September	321.15
October	374.30
November	401.40
December	433.45
Total, yr.	3987.45

NEW YORK, 318 West 42d Street. BOSTON, 820 Beacon Building. PHILADELPHIA, Broad and Arch Streets. ST. LOUIS, 712 Roe Building. CHICAGO, 218 La Salle Street. SAN FRANCISCO, 712 Polk Street.

WELSBACH STREET LIGHTING COMPANY

....OF AMERICA....



No. 36.

Controls and Operates the **Welsbach System of Street Lighting,**

Which includes its specially DESIGNED and PATENTED BURNER for PARK LIGHTING exclusively.

Uniformly SUCCESSFUL in 150 Cities and Towns.

By means of the Welsbach System of street lighting the superiority of GAS over electricity for street lighting has been fully demonstrated.

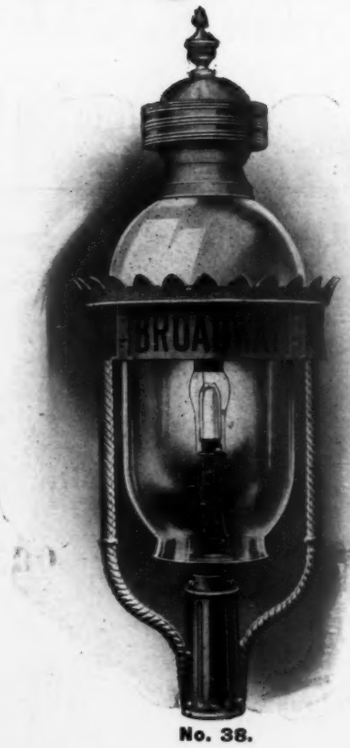
POINTS OF MERIT:

It is { Economical, Attractive, Successful, Up-to-date.

IT LIGHTS THE STREET.

Where there are no gas mains we can furnish an equally good light by our SELF-GENERATING NAPHTHA WELSBACH BURNER, and thereby supply a uniform light in all localities.

Correspondence Solicited from Gas Companies and Others interested in Municipal and Outside Lighting.



No. 38.

THE NEW NO. 7 WELSBACH DINING ROOM FIXTURE.

PRICE, EACH, COMPLETE, WITH SHADE, FRINGE, MANTLE AND CHIMNEY, $14. PER DOZ., $150. DISCOUNT, 50 PER CT.

Standard Length, 30 inches.
The New No. 7 Welsbach Dining Room Fixture, when ordered, will be sent complete, as follows:

1 No. 7 Harp Fixture and Brass Crown finished in Brushed Brass.
1 No. 66 Welsbach Burner (high candle power).
1 No. 4 Pilot By-pass.
1 No. 4197 Mantle — Intensive Brand.
1 No. 306 Chimney (air hole).
1 Fourteen-inch GREEN Art Glass Shade, with six-inch Green Beaded Fringe.

This fixture is being largely used by Gas Companies as a dining room fixture at the popular retail price of $10 complete, and is a great favorite for moderate sized two and three-story residences. In popularity and price it is unequalled.

VARIATIONS.

Finished in oxidized copper, oxidized brass, etc., 25 cents extra.

Shades in Ruby and Green--Ruby, Amber and other colors, without extra charge.

Special colors require a few days extra time to fill orders.

Green Shades will be shipped unless otherwise ordered.

WELSBACH CO.,

Salesrooms in All the Principal Cities of the United States.

Factories:

GLOUCESTER, N. J.
CHICAGO, ILL.

THE UNITED GAS IMPROVEMENT COMPANY

For the Year Ending December 31st, 1905, has been Awarded Contracts for 40 Sets of

Standard Double-Superheater Lowe Water Gas Apparatus.

PARTIAL LIST OF PLACES:

Catasauqua, Pa.
Plattsmouth, Neb.
Detroit, Mich. (2d contract).
Springfield, Ills.
Oneonta, N. Y. (2d contract).
Pottsville, Pa. (2d contract).
Evansville, Ind. (2d contract).
Lansdale, Pa.
Hempstead, N. Y. (2d contract).
New Britain, Conn.
New York, Mutual Co. (3d contract)
St. Louis, Mo. (4th contract).
Sioux City, Ia. (3d contract).
Amsterdam, N. Y.
Houston, Tex. (2d contract).
Hamilton, O. (2d contract).
Indianapolis, Ind. (2d contract).
Nanticoke, Pa.
Hazleton, Pa.
Mahanoy City, Pa.
Ludington, Mich.
Ossining, N. Y.
Lancaster, Pa.
Flushing, N. Y. (2d contract).
South Bend, Ind.
Fall River, Mass. (2d contract).
Minneapolis, Minn. (2d contract).

TOTAL SETS TO DECEMBER 31, 1905, ... 593
TOTAL DAILY CAPACITY TO DECEMBER 31, 1905, 463,780,000 CU. FT.

The United Gas Improvement Company,

Broad and Arch Streets, Philadelphia.

Established 1858. Incorporated 1890.
CHAS. E. GREGORY, Prest. DAVID R. DALY, V.-Prest. & Treas.
H. D. ABERNETHY, Sec.

J. H. Gautier & Co.

Greene & Essex Streets,
Jersey City, N. J.

MANUFACTURERS OF

CLAY GAS RETORTS, FIRE CLAY TILES, FIRE BRICK and FIRE CLAY SPECIALTIES.

Ground Fire Clay, Fire Sand and Ground Fire Brick in Barrels and Bulk.

SOLE MANUFACTURERS OF THE

FLEMMING GENERATOR GAS FURNACE

Brooklyn Fire Brick Works,

OFFICE AND WORKS:
88 VAN DYKE ST., BROOKLYN, N. Y.
MANUFACTURERS OF

CLAY GAS RETORTS & SETTINGS, GENERATOR LININGS. SPECIALTIES.

ST. LOUIS GAS CONSTRUCTION CO.,

DESIGNERS AND BUILDERS OF

COAL GAS BENCHES,

SPECIAL HIGH GRADE REFRACTORY MATERIAL FOR BENCH SETTINGS AND WATER GAS LININGS.

SOLE AGENTS FOR

CHRISTY SETTINGS.

CORRESPONDENCE SOLICITED.

ST. LOUIS, MO.

STANLEY'S CELEBRATED FIRE CEMENT

For the Repair of Clay and Iron Retorts & Firebrick Work, for the Protection of Ironwork when Exposed to a High Degree of Heat, and Excellent for Mouthpiece Joints.

In General Use in the United States and Canada.
Unlike Expensive Preparations,
THERE IS ABSOLUTELY NO WASTE.

F. W. STANLEY,
150 Nassau St., New York, N. Y.

ALBERT J. WEBER, President and General Manager.

Established 1846.

Adam Weber Sons.

Manhattan Fire Brick and Enameled Fire Clay Retort Works.

Works at Weber, on the Raritan River. Middlesex County, New Jersey.

GENERAL OFFICES:
Park Row Building, New York City.

Modern Coal Gas Benches,

With either Horizontal or Inclined Retorts, Half-Depth and Full-Depth Recuperative Furnaces.

ADAM WEBER PATENTS

STANDARD BENCH IRONWORK.

Linings for Water Gas Apparatus, High Grade Fire Brick of All Shapes and Sizes, Ground Fire Clay, Ground Fire Brick in Bulk or in Barrels.

ISAAC C. BAXTER, President.
Works.
LOCKPORT STATION, PA.

ESTABLISHED 1864.

JAMES GARDNER, JR., CO.,

Successor to WILLIAM GARDNER & SON.

PETER YOUNG, Secretary and Treas.
Address all communications to
JAMES GARDNER, JR., CO., Room 202 Lewis Bldg.
PITTSBURGH, PA.

Fire Clay Goods for Gas Works.

HENRY MAURER & SON,

(ESTABLISHED 1856.)

EXCELSIOR FIRE BRICK & CLAY

RETORT WORKS

WORKS, Perth Amboy, N. J.
OFFICE, 418 to 422 East 23d St., N. Y.

Clay Gas Retorts,

BENCH SETTINGS,

Fire Brick, Tiles, Etc.

GEROULD'S IMPROVED RETORT CEMENT.

A Cement of great value for patching retorts, putting on mouthpieces, making up all bench-work joints, lining blast furnaces and cupolas. This cement is mixed ready for use. Economic and thorough in its work. Fully warranted to stick.

Price List, f.o.b. PITTSBURGH, PA.
In Casks, 400 to 800 pounds, at 5 cents per pound.
In Kegs, 100 to 200 " " 6 " "
In Kegs less than 100 " " 7 " "

C. L. GEROULD,
1200 Bank for Savings Bldg., Pittsburgh, Pa.

NATIONAL PYROGRANIT COMPANY,

MANUFACTURERS OF

Fire Brick, Tiles, Special Shapes, etc.

NEW YORK OFFICE:
17 Battery Place, New York.

WORKS:
South River, N. J.

ESTABLISHED 1868.

L. N. RANCKE, Vice-Pres. & Mgr. F. SCHIAFFINO, Sec'y & Treas.

BALTIMORE RETORT & FIREBRICK CO.

BALTIMORE, MD.,

Manufacturers of all Material for the Construction of Coal Gas Benches.

HALF AND FULL DEPTH AND FREE FIRING BENCHES,

All styles of which we have in operation, equipped with the BEST of LATEST IMPROVEMENTS, proving our claim for SUPERIOR QUALITY and EFFICIENCY.

INCLINES—We have in SUCCESSFUL OPERATION benches of Inclined Retorts, MANUFACTURED and ERECTED by us.

WALDO BROS., 102 MILK ST., BOSTON, MASS.,
Agents for New England States.

LARGE FACILITIES—Correspondence Solicited.
RAIL and WATER CONNECTIONS to ALL POINTS.

JOHN DELL,
President and General Manager.

MISSOURI FIRE BRICK CO.,

ESTABLISHED 1882.

MANUFACTURERS OF

Gas Retorts, Bench Settings, Fire Brick, Cupola Linings, Etc.

We are the **Exclusive Agents** *for the* **Mitchell Patent Benches,** *Constructed with Half or Full Depth Furnaces, to Burn either Coal or Coke, and Arranged for Front or* **Rear Clinkering.** **The Mitchell** *is the* **Original Coal Firing Bench.** *We also Erect Plain Benches with* **One to Six Retorts.**

YOUR CORRESPONDENCE IS RESPECTFULLY SOLICITED.

City Office:
411 Olive Street,
Continental Bank,
ST. LOUIS, MO.

Bronder Patent Stoking Machinery.

Three-Scoop and Three-Rake Charging and Discharging Machines are operating in New York, Newark, N. J., Philadelphia, Worcester, Mass., Mt. Vernon, N. Y., Toronto and Montreal, Canada.
Four-Scoop and Four-Rake Charging and Discharging Machines are operating in Detroit, Mich.
These are the only machines that will draw or charge simultaneously 3 or 4 retorts (vertically) and handle from 42 to 60 retorts in from 25 to 30 minutes, lid opening and closing and filling of furnaces included.
Hot Coke Conveyor, Quencher and Steam Exhauster, operating in Toronto, Canada, working in water-sealed flue, rollers being protected from heat and grit.

COAL CRUSHERS, CONVEYORS AND BINS. TURNTABLES FOR MACHINES.

Labor-Saving Machines for Handling Coal and Coke from Coal Cars to Coke Yard or Bins, a Specialty.

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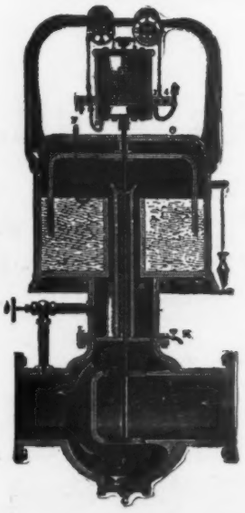
229 BROADWAY, NEW YORK.

CONNELLY IRON SPONGE AND GOVERNOR CO.,



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COAL OR WATER GAS PLANTS,

Automatic, Balance, High Pressure and Service Governors,

Roots Improved Gas Exhausters,

Iron Sponge, Purifying Material for Gas Purification, Jones Jet Photometers, Pressure Registers, etc.,

INSTALLATION OF SMOKELESS TAR BURNING SYSTEM.

Reinforced Concrete Construction for all Purposes.

Wide Experience in High Pressure Installation and Extension,

GAS SPECIALTIES.

395 Broadway, NEW YORK.

295 West 22d Street, CHICAGO, ILLS.

PARKER-RUSSELL MINING AND MFG. CO.,

OF ST. LOUIS, MO.,
PROPRIETORS OF THE

OAK HILL GAS RETORT AND FIREBRICK WORKS.

ST. LOUIS OFFICE: 417 Pine Street. NEW YORK OFFICE: Aldrich Court, 45 Broadway.

WE MAKE A SPECIALTY OF WATER GAS LININGS AND CHECKER BRICK.

Half and Full Depth Benches of Our Own Design, Containing 6, 8 or 9 Retorts.

SLOPERS.—We have perfected plans of INCLINED RETORT BENCHES, designed to meet conditions prevailing in America, and constructed entirely of American materials.

We Build Benches Complete. Ready for Gas Making. Also,
RETORT HOUSES,
COAL and COKE CONVEYING MACHINERY.

Plans, Specifications and Estimates Cheerfully Furnished.
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ALL CONTRACTS MADE AS OF ST. LOUIS, MO.
Gold Medals awarded by the Louisiana Purchase Exposition at St. Louis, for fireclay gas retorts, gas retort benches, firebrick and setting tiles.

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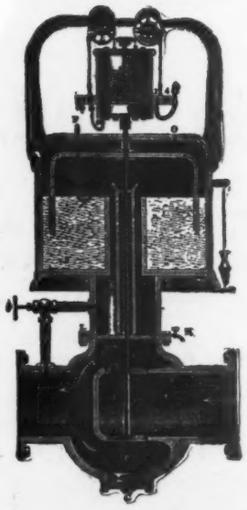

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JAMES D. PERKINS, President. F. SEAVERNS, Treasurer.

THE PERKINS COMPANY,

228 and 229 Produce Exchange, New York City.

Ocean Mine Youghiogheny Gas Coal, Old Kentucky Shale and O. K. Boghead.

SHIPMENTS FROM NEW YORK, PHILADELPHIA, BALTIMORE AND NORFOLK.

BERWIND-WHITE COAL MINING COMPANY'S

Ocean Westmoreland Gas Coal.

Offices:
Washington Building, New York.
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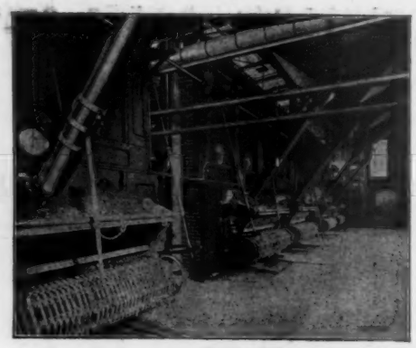
STRICTLY High Grade. . . . .
Carefully Prepared.
For Gas Making or
Heavy Steaming.

A. C. M. AZOY, General Agent, 1 Broadway, New York.

JEFFREY PIVOTED BUCKET CONVEYER for COAL and ASHES.

ELEVATING, CONVEYING, SCREENING,



CRUSHING, POWER TRANSMITTING.

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THE CALORIFIC POWER OF FUELS.
By HERMAN POOLE, F.C.S.

Second Edition. Price, $3. For Sale by
A. M. CALLENDER & CO., 42 PINE ST., N.Y. CITY.

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FRED. BREDEL COMPANY,

ENGINEERS AND BUILDERS OF GAS PLANTS.
Inclined Benches, own system, Recuperative Furnaces, Exhausters, Exhauster Governors, Condensers, Washers, Coolers, Wet Purifying Plants, Purifiers, Oxide Elevators, Hydraulic and Dry Coke Conveyors.
Special High Grade Material for Recuperative Furnaces.
Licensees for ARROLL-FOULIS Charging and Discharging Machines and FRONHAUSER Coke Conveyors. OFFICE, 405 KEENE ST. MILWAUKEE, WIS.

KELLER ADJUSTABLE COKE CRUSHER

Strong, Simple, Durable. Will Crush any Size Desired.

C. M. KELLER,
Sec. & Supt. Gas Lt. & Coke Co.,
Columbus, Ind.
Correspondence Solicited.

BAXTER & YOUNG,

CONTRACTING AND CONSULTING GAS ENGINEERS.

Examination and Values Ascertained of Artificial and Natural Gas Properties.

COMPLETE GAS WORKS ERECTED.

Artificial and Natural Gas Mains Furnished and Laid.

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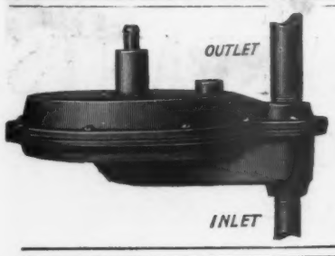

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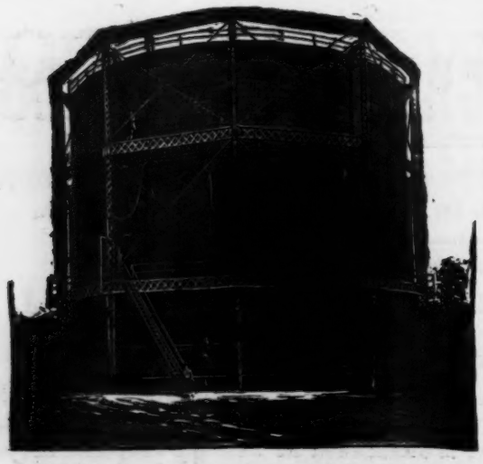

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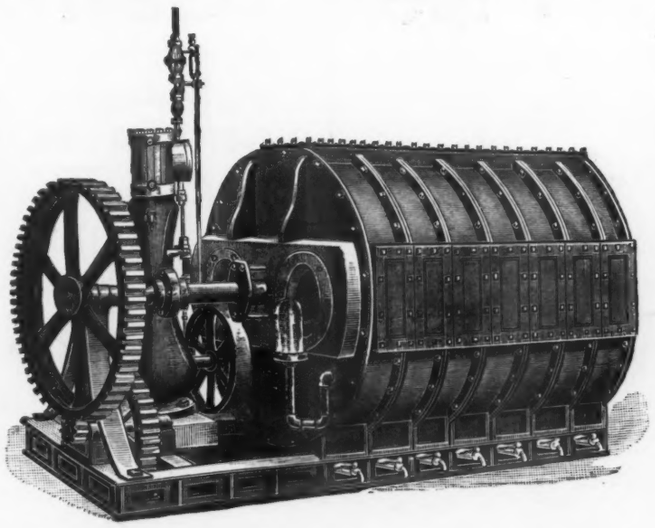

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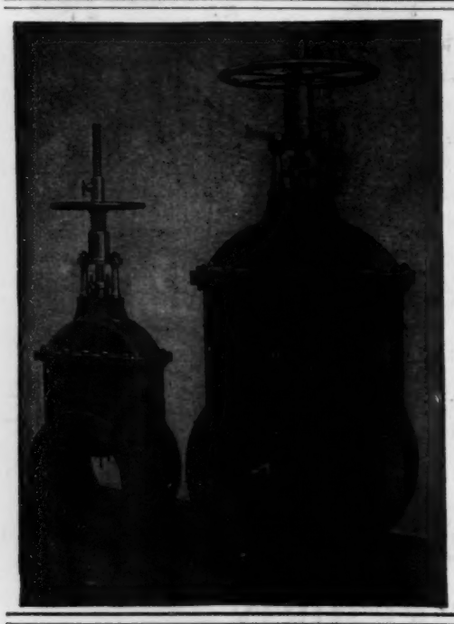

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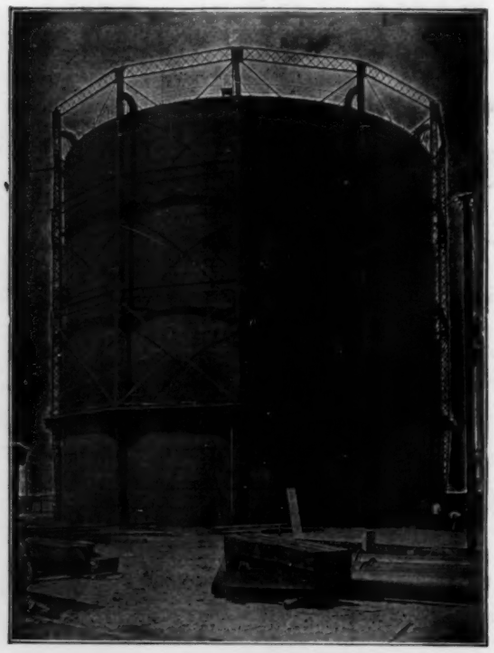

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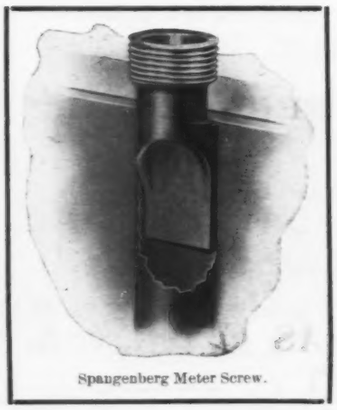

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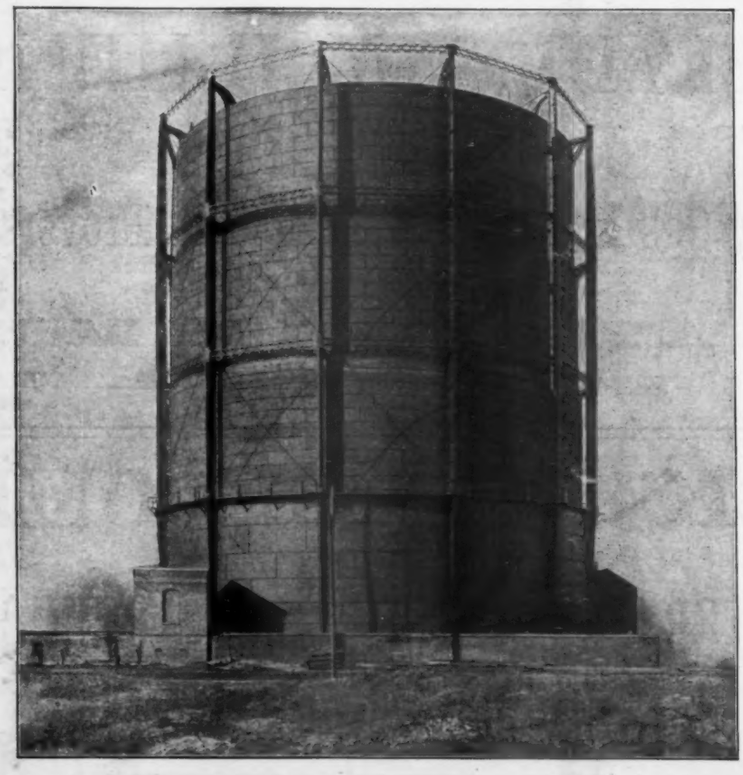

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